OFFICIAL PUBLICATION OF THE PHOTOGRAPHIC SOCIETY OF AMERICA

PSA Journal

Volume 26 June, 1960 Number 6

Number 10 of a series **Great photographers of the world** Lester Bookbinder

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Features

- Cover: Female Yellow Warbler and Nest . Morton Strauss
- Wichita Regional Convention 16
- Montreal Regional Convention 18
- South Africa Welcomes The Goldmans
  Dr. A. D. Bensusan, FPSA, FRPS, Lionel Bevis and Lewis Lewis 20
- Landscape Impressions . . . . . Rita and Relfe Ehret 22
- Pattern Is Where You Find It . . . . Samuel Grierson, APSA 24
- Hold Your Finger Over The Lens . . . . . Howard Oberlin 26
- Photographer of Fine Art 26
- Photography in The Fine Arts, A Portfolio
  Joseph A. Bernstein, APSA 27
- Headquarters Drive Pushes Toward Finish Line
  Irving A. J. Lawres 32

PS & T Supplement

- Editorial: The Rest of the Team . . . . . Ira B. Current, FPSA 33
- Magnification and Depth of Detail in Photomacrography
  H. Lou Gibson, FPSA 34

Cine Section

- It Can Happen To You . . Al Morton, APSA, FACL, FACI 49
- Cinema Clinic . . . . . George W. Cushman, APSA 51

Departments

President Reports	2	PSA News	11
Eastern Zone News	4	Obituaries	11
Western Zone News	5	Recorded Lectures	14
Canadiana	6	National Lecture Program	47
South of the Border	7	New Products	47
Star Ratings	8	Trading Post	47
Camera Clubs	10	Exhibitions and Competitions	54
PSA Calendar	11	PSA Services	55

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The President REPORTS

George F. Johnson, FPSA
Conventions Vice President
Guest Reporter

Five major, PSA-sponsored conventions have been or will be held in North America this year. Two of these are regionals in Canada—The Victoria Regional at Victoria, B. C. June 10-12 and the Montreal Regional in Montreal June 24-26. Two other regionals are the Grand Rapids Regional in Grand Rapids, Michigan June 3-5, and the Wichita Regional in Wichita, Kansas, June 17-19. Great interest has been developed in Regional Conventions, of which three or four are planned each year in areas somewhat removed from the site of the National.

Our National Convention this year will be in the Rice Hotel, Houston, Texas, October 11-15. This will be the first time in our history, I believe, that the Lone Star State has hosted the National. Jack Wallace, general chairman, and his staff are working with great diligence to make the Houston program, exhibition, and field trips especially attractive to every PSA member.

The four-day program is now worked out in complete detail with over 50 speakers committed to give informative, illustrated talks and discussions. Field trips of unsurpassed interest are definitely assured.

I am confident PSA members who have attended regional or national conventions in the past will agree with these observations: 1) You only receive full value out of PSA membership when you attend one or more conventions each year: 2) There is no better opportunity to get acquainted with PSA men and women around the world than at a National Convention; and 3) You can learn more about photography in the few days spent at a PSA Convention than in any other way you might spend that length of time. It should be remembered that our conventions, through the payment of a nominal registration fee, are open to every one, whether a PSA member or not.

Excellent as our conventions have been, we know they can still be improved. We, therefore, urge all persons who attend these conventions to give us any practical ideas for betterment.

Our national and local convention committees deserve sincere commendations for their untiring effort. Be ever mindful of the fact that these diligent PSAers work without personal financial remuneration.

Special credit and recognition are due the National Conventions Committee: Lionel E. Herrmann, APSA, general chairman; Ralph L. Mahon, APSA, exhibition chairman; John I. Fish, FPSA, publicity chairman; Fred B. Shaw, APSA, program chairman; R. B. Horner, APSA, financial chairman; and Lyall F. Cross, FPSA, regionals chairman. (*Continued on page 4*)

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How professional should a camera be?

How much camera should a pro invest in?

First, it depends on the features he needs. If he's like most pros he can't begin to itemize the hundreds of different types of jobs he handles—everything from portraits to microphotography. In the long run he might wind up buying half a dozen "specialized" cameras to fill his requirements.

The single lens reflex Hasselblad eliminates this. With *one camera*, plus interchangeable accessories, you can get over 100 combinations, and set up in seconds for practically every shot known to photography. Four different lenses, three film magazine sizes plus a sheet film holder, four types of viewers—everything changes. The Hasselblad makes it absolutely needless to carry more than one camera on an assignment.

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The precision single lens reflex system, of course, completely eliminates parallax. Focus and depth of field appear on the print-size ground glass just as the film will take them. A pop-up magnifier allows you to focus accurately on minute details. There are no surprises waiting for you in the darkroom with a Hasselblad.

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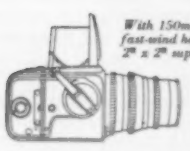


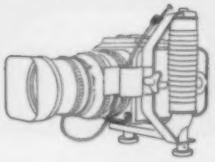
With 150mm lens, fast-wind handle, 2" x 2" superslide back

With prismatic sports finder

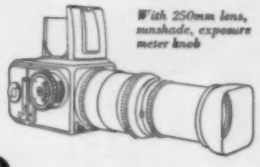
With magnifying hood, 60mm lens, back for 16 1⅝" x 2¼" exposures, exposure meter knob

With sports finder, camera grip, 80mm lens

With magnifying hood, cut film adaptor and holder



With 150mm lens, sunshade, flash gun bracket, back for 12 2¼" x 2¼" exposures



With 250mm lens, sunshade, exposure meter knob

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The President Reports

(*Continued from p. 2*)

It is probably too late to enter a plea here to attend one or more of the Regionals held from June 3 to June 26 as already indicated, but I can say with great enthusiasm: Make plans now for Houston. Watch the Journal for the registration form and hotel reservation blank. Help the local convention committee in Houston by prompt pre-registration. And don't fail to read about the fabulous photo opportunities in Houston and environs as featured in the PSA Journal.

EASTERN ZONE

Editor, O. S. Larsen
70 Strawberry Hill Ave., Stamford, Conn.

Photo by Alex Potamianos

Mrs. Ruth M. Rowe, New Haven, Conn., new Chairman of Connecticut Chapter PSA, being congratulated by Edward H. Hutchinson, APSA outgoing Chairman. Other officers installed at the annual meeting are: Alex Potamianos, Hartford, Vice Chairman, Miss Charlotte Seidl, Hartford, Secretary and Harold L. Pratt, Windsor, Treasurer.

Ralph (Skipper) Miller, APSA, was the guest speaker.—*Alex Potamianos reporting.*

New Council in Southern Florida

On February 28, 1960, representatives from the Deerfield Beach CC, Ft. Lauderdale CC, Miami Movie Makers, and Miami Photographic Society met at the Deauville Hotel on Miami Beach and formed the South Florida Camera Club Council with Mel Greene, MPS, temporary President. Permanent officers will be elected in May.

The purpose of the Council is to bring the clubs of S. Fla. closer together through the exchange of ideas; exchange of prints and slides; provide judging service; hold field trips, annual get-togethers of member clubs, and to host the PSA Southeastern Regional of 1961. It is hoped that other clubs in S. Fla. area will join the Council. Good luck S.F.C.C.C.—*Maurice H. Louis, FPSA, reporting.*

Pittsburgh Club Repeats Field Trip

On March 19 the Natural Color Camera Club of Pittsburgh, Pa., made its second trip to "Old Economy" at Ambridge, Pa. The first trip was an all day field trip made last summer. The second trip was to present to "Old Economy" a set of slides taken on the first trip.

"Old Economy" is the last home of the "Harmony Society," a communal effort that lasted from 1803 until 1905. In 1824, these German immigrants moved from New Harmony, Indiana, the second town they had built in America, to this 3000 acre tract on the banks of the Ohio River about eighteen miles below Pittsburgh. Here they built a large and prosperous community. At one time there were some three hundred homes, farms, factories, hotels and stores. They owned oil lands, railroads, large shares in many manufacturing plants in the district and built one entire town, the county's first housing development.

Today the main portion, comprising some fifteen or eighteen buildings, a large wine cellar, feast hall, the Great House, home of the various leaders, several shops and large gardens, is owned by the Pennsylvania Historical and Museum Commission. It is operated as a "living museum." The homes are furnished with the original furniture and the shops have original operating equipment. Everything is being brought back to the 1850-60 period.

At the presentation ceremony, attended by more than one hundred people, a display of old photographic equipment had been set up by the curator, Lawrence Thurman. This included old magic lanterns and slides, a stereo camera of the late 1880's, several hand viewers and a stereo viewer. Several cameras of Civil War vintage and two microscopes from the early 18th century were on display. Special viewing cases contained several hundred glass slides of European cities in the late 1800's and the Japanese Army during the Russo-Japanese war.

After the ceremony the crowd scattered to photograph the many exhibits as well as some of the many possibilities missed the first time. A trip through "Old Economy" should be a "must" for any PSAer visiting the Pittsburgh district because of its historical as well as photogenic interest.—*Myron B. Sharp reporting.*

Boston YMCA CC

Nathaniel H. Pulling, Ph.D., APSA, recently premiered a new slide talk, "The Folks Around Us" at the Boston YMCA CC. Designed as an introduction to photography, this analytical lecture made use of split frames for emphasis and comparison of bracketed exposures. Recently this active club sponsored PSA membership for the Recreation CC, Somerville, Mass. and the Boston YWCA CC, and presented PSA through a special slide show and discussion at the newly formed Wilmington, Mass., CC.—*William F. Porter reporting.*

Thru The Lens Tour for Nutmeggers

The travel minded Nutmegger CC of Hartford, Conn. is preparing to invade Mexico this summer in a Thru the Lens Tour under the leadership of Cecil B. Atwater, FPSA. Marion Lewis and Harold Pratt are co-chairmen for the venture.—*From the Nutmegger News 'n Views.*

VSP Land Cruise June 18

Volunteer Service Photographers will conduct a Camera Coach Cruise of Gardens and Harbors of Long Island, for the benefit of their Hospital Rehabilitation Photography Programs, on Saturday, June 18th. The $10 charge covers motor coach fare, admissions to gardens, door prizes, photo contest and a mid-day seafood dinner. Reservations are limited and should be ordered from VSP, 111 West 57th St., New York 19, N.Y. For information call CI 6-3965.

Lone U. S. Winner

A gold medal symbolizing top award in the VIII International Photo. Exhibition at Rio de Janeiro has been received by Robert J. (Bob) Phillips of the 3 F Color Slide Group, Washington, D.C. Of eleven awards competed for by photographers of forty nations, this was the only trophy which came to the United States.—*Ollie Fife, APSA reporting.*

CCCW Little Exhibit On The Road

Twenty color slides from as many Color Camera Club of Westchester (N.Y.) exhibitors will be shown in European cities, supplementing the showing of "Around the World with PSA," a featured program at Louisville last October. This invitational exhibit comprises slides with comments from nine of PSA's foreign affiliated clubs or salons, including Turin, Italy; Barcelona, Spain; and Luxembourg, where the set is being shown during May.

CCCW members, Anne and Arthur Hatcher, are including these visits in a pleasure trip to Europe. They have also been invited to meet the Kameraseura, Finland's largest camera club, and to show the exhibit there late in June.—*Betty Diamond reporting.*

Metro CCC (N.Y.) Moved

The new address of Metropolitan CC Council is Room 514, 549 Church St., New York 7, N.Y. Telephone BArclay 7-2450.

PSAers in Brief

John G. Mulder, Hon. PSA, FPSA, has been appointed administrative assistant to the general manager of Kodak Park, manufacturing unit of EK. He is a Past President of PSA and is now serving as vice chairman of the Photographic Standards Board of the Am. Standards Assn. . . . Congratulations to George Munz, FPSA, on his receipt of a citation for Advancement of Photography from the N. J. Federation of Camera Clubs. . . . Glad to hear Leslie Campbell, Belchertown, Mass., is making a fine recovery from a recent operation in Boston. He is recuperating at home. . . . Ruth Coleman of Brooklyn, N.Y. is on tour around the world, has a date in Hong Kong with Daisy and Francis Wu and hopes to meet Loke Wan Tho, APSA, in Singapore. . . . Mrs. Barbara Green, FPSA of Brooklyn, N.Y. is starting an all U.S. lecture tour in September under PSA's NLP banner, with three lectures in Hawaii, including a convention on Hilo, Sept. 3rd. Barbara is handling her own bookings.

WESTERN ZONE

Route 3, Box 787, Porterville, Calif.
Editor: A. H. Hilton, APSA

Colorado Council Annual Convention

Out here in the Queen City of the Plains, Denver, Colorado, we're "coming of age," and pardner, we're doggone proud of our growth.

On February 27 and 28 we had the best ring-tailed snorter of a winter blizzard you could serve up in any man's country. This created a problem for the local gentry, but there was one segment of the population that pulled on boots, heavy top coats, parkas and (we quietly suspect long handles—you know we've got 'em out here) and made their happy way to the fine Cathedral Room at the historic old Albany Hotel in Denver for the Annual Convention of the Colorado Council of Camera Clubs. The Council has only this year graduated to (1) a full-blown convention. and (2) a two-day meet.

During print judging at Colo., CCC Convention. Left to right, Hal Gould, Ralph Berry, President Colo., CCC, John Maxwell, L. A. Lucas.

There was a handsome representation from out in the state and from as far north as Wyoming. The two days of photographic activities were hailed as a big step in our progress. The first day, Saturday, we enjoyed a splendid black and white judging conducted by local professional photographers who really had the spirit of the thing at heart. Among themselves they expounded professional theories and their differences of opinion not only formed a base for helpful discussion of the prints being judged, but warmed things up considerably.

The afternoon session featured the judging of nature division color slides and here again a fine group of judges keenly interested in objective judging based on true nature photography made a splendid showing for themselves and exhibitors in the selection of top slides for that division.

One of the finest inspirational documentations of nature photography we've had the pleasure of viewing was presented by Ken Hikida of the Greeley Shutterbugs. He had aptly titled his show "—and Nature Created Color." Stereophonic tape accompanies the selection of slides which have as their theme selective focus of exquisite flowers and grasses. The pictures and music carry the theme and only occasionally some softly-spoken philosophic poetry is interjected by a lovely feminine voice, thus bringing minds into complete harmony with the audio-visual presentation.

"Salon Prints From Your Minature Negative" by George Ward concluded a big day for the black and white workers. A fair share of the program of the day was slated to meet the resurgent demands for constructive aid in black and white work for color-shooting converts.

Sunday morning we, and the snow, were back at it. Judging of pictorial division color slides got under way. The judges were well-rooted in their concepts for the fine pictorial representation of work they were to judge.

Sunday afternoon an excellent presentation was made through the courtesy of the Eastman Kodak Company. The feature was "Jet Colorama"—the full story in 16mm sound movie of shooting and producing the finished mural that hangs in Grand Central Station in New York City. This feature alone, drew a large audience of non-camera club members, and a most appreciative one.

The last program of Sunday afternoon was a splendid showing of stereo slides by the Rock Mountain Stereo Club. The audience was captivated by the beauty and depth of the work done by this group and the narration was capably handled by Brenton Madison and Glen Thrush, APSA.

The culminating highlight of two days of photographic feasting was the Awards Banquet held Sunday evening. It was indeed gratifying that awards were well-distributed throughout the Council-active clubs. Top awards in the three divisions, black and white, nature, and pictorial color went to Colorado Springs, Greeley, and Denver, respectively. Each top exhibitor's club is a member of the Photographic Society of America. Awards of Merit and Honorable Mentions were equally distributed which certainly indicates a representative group of photographers working within each club to perfect a hobby to satisfy expressions of individualism and technical excellence.

6th Annual Photorama

It was a field day for all photographers last month at the 6th Annual Photorama, presented by the Southern California Association of Camera Clubs in the Conference Area of Balboa Park, San Diego, California.

There were beautiful models, featuring Miss Photorama as chosen by the vote of all registered photographers, also character models, all in specially prepared settings. The photo exhibit was excellent as always, with many special awards given for the best pictures. The 6th Annual Photorama was reported a great success.

News From The Northwest

Seattle Downtown YMCA CC will have the privilege of attending a combined rail and boat excursion via Anacortes to Friday Harbor in the San Juan Islands in the month of May. This trip promises much interesting photographic material; Great Northern Railroad says it will be the LAST trip of the diesel engine over this track. Another unusual field trip will be the one to a NIKE Base being planned by members of Spokane CC for May first.

In the last issue of SHORT EXPOSURES, monthly bulletin of f/67CC of

Bremerton, we noticed a brief but interesting history of the club printed for the benefit of new members. PSA member Paul Newman has just been elected to the office of president.

An appropriate category for shutterbugs at this time of year is "Botany," the subject selected by Bellevue CC for June competition. We are told it is to include not only flowers, but vegetables, fruit, trees, shrubs, and so on. This club also plans a tie-in Sunday trip to the well-known OHME GARDENS near Wenatchee in May.—*Winnie Van Sickle, reporting.*

CANADIANA

Editor: Rex Frost, FPSA
37 Bloor St. W., Toronto

Recorded Lecture Programs

As of April 1st 1960, 36 Canadian CC's have been making use of PSA's RLP services. The information comes my way from Walter Bullerman, 4166 Arthur Ave., Brookfield, Ill., international distributor of recorded lectures.

16 Ontario Clubs utilizing RLP programs include CC of Ottawa, Ottawa CPAC, RACC, Ottawa, Belleville, Chatham, Cobourg, Deep River, Gravenhurst, Oshawa, Peterboro, Trenton, Sarnia, Cornwall, Etobicoke, Hart House and Toronto Guild for Color Photography.

10 British Columbia Clubs include Nanaimo, New Westminster, Penticton, Nompkish, Port Alberni, Victoria, and four Vancouver groups, Lions Gate, Vancouver PS, YMCA and Esso.

In Winnipeg, Man., Manitoba CC, and the YMCA Club, have been using the service.

In Alberta, Calgary's Color Photo Club, and Calgary CPAC, the Crossroads and Gateway CC's of Edmonton are listed.

In Quebec Province, Montreal Board of Trade, and Montreal CC's have taken advantage of RLP programming.

The Color Photo Guild of the Maritimes at Halifax, together with the Wings Photo Club of Canada's Armed Services in Europe have also used the RLP's.

Many of these have been mentioned in Canadiana during the past season, but there have been many omissions because your Editor still is not receiving club bulletins from all PSA affiliates in this country. May I ask all Club Secretaries to place my name on their club bulletin mailing lists.

Writes Walter Bullerman, "I'm sure these Clubs will appreciate knowing that we are all glad to be of service to them."

This is a reminder to all Program Chairmen who may now be planning their 1960-61 season, to make sure they take full advantage of this useful and popular PSA Recorded Lecture service.

Doscher Short Courses

About 120 members of Leaside CC, Toronto Guild for Color Photography, and Toronto CC attended the course given by John W. Doscher at Leaside Library. Comment in Nu-Vu, Leaside CC Bulletin said . . . "Mr. Doscher's personal charm, unlimited experience, vast knowledge and careful teaching technique made the course very much worthwhile for relative newcomers, and stirred up the oldsters with new approaches."

John Doscher is guest banquet speaker, and will present a "short course" at Montreal, PSA Regional, June 24-25-26.

Instruction Slide Sets

In reference to the March Canadiana announcement that Edward G. (Ted) Tozer has been named Canadian distributor of CD Instruction slide sets, please note his correct address is 310 Elmgrove Ave., Oshawa, Ont.

Ted advises that the first of these, Lew Trapp's "Tips for Beginners," is scheduled to finish its first round in June. This set will be available to any Canadian CD member for home study from then on, for a second circuit.

Two more slide instruction sets will be available shortly, one of which deals with studio portraits.

Important too, the $1.00 fee formerly charged for the service has now been dropped.

To avail yourself of this useful PSA service, Ted Tozer's your man. Write him direct.

Nature Division Slide Sets

Mary Ferguson, Canada's Nature Divn. Chairman, now has seven nature slide sets available to Canadians. Flowers by Paul Wolf. Trek in an Insect Jungle, by Alfred Renfro, Buffalo Internatl. Exhibition set of 1954. Columbus Int. Ex. set of 1959.

Now—add

New Kodak Sound 8 Projector records voices, music, sound effects —plays back with amazing fidelity

Words to tell a story . . . music to create a mood . . . sound effects to bring a scene to life. You record them all—right on your new or old 8mm films—with the new Kodak Sound 8 Projector.

A stripe of magnetic oxide, added to the edge of your film, serves as your sound track.

As the Kodak Sound 8 projects this striped film—at 16 or 24 frames per second—you have virtually unlimited freedom to record voices, music, special effects on the track.

To record voices, you use the microphone that comes with the projector. To add background music and sound effects, just connect your record player or tape recorder to the projector, using the phono attachment included with the projector.

The Kodak Sound 8 Projector gives you the flexibility of a tape recorder. You can record and play

Canadian Closeups by the Ferguson-McGregor-Goodwin trip, PSA Convention, 1958. Spiders by Dr. B. J. Kaston. Hummingbirds by Burdette White.

The two last mentioned are new arrivals for distribution.

Write Mary Ferguson . . . "Requests for PSA, Nature Divn. Slide Sets are more frequent than formerly, but it is a pity more members do not use them."

For personal or group study, these ND slide sets can be made available directly from Mary Ferguson, 76 Kilbarry Rd., Toronto.

Toronto CC

A unique situation developed in Toronto CC's Color Division seasonal contest which normally awards an annual medal for the highest aggregate score. Two members, Jim Beveridge and Phyllis Treloar ended up the season, each with tying scores of 405 points.

Never in Toronto CC history, dating back to 1888, have top honors ever been shared in a club contest, necessitating the presentation of two medals.

During the 1959-60 season, 33 Class A members, and 42 Class B members submitted 380 and 240 slides respectively. Kay McGregor earned 5 H.M. ribbons, June Brown, Dr. M. A. Chantler, Dick Thomson and Phyllis Treloar earned 4 apiece.

Hart House CC, University of Toronto

In this year's photo contests sponsored by The Natl. Federation of Canadian University Students, Hart House CC members won 28 of the 69 prizes given in all divisions, including 2 firsts, 3 seconds and 6 thirds.

At the recently concluded International Intercollegiate Photography contest, Hart House CC members won 8 of 58 awards. 32 Universities across North America entered over 1,000 prints. Hart House's Ed Hoshkiw, and Ron Carr won 2nd and 3rd prizes in the Pictorial Divn., respectively. Ron had two H.M.'s. These two young men, plus three other members of the University of Toronto group, have become individual members of PSA, since their Club became a PSA affiliate last year.

It's an exceptionally active Club, which expresses the enthusiasm and vigor of youth.

Sarnia

Sarnia CC and Photochromatic of Sarnia recently played host to the 5th Western Ontario Invitational Salon. Doug Paisley, Sarnia, Cliff Pugh and Lew Trapp of Toronto CC judged 236 color slides and 87 prints.

Windsor CC won all three top honors in color, plus 1st and 3rd in prints. Sarnia took the 2nd print award. Other western Ont. CC's participating in the salon were St. Thomas, London, Chatham, Ingersoll and Ridgetown.

Victoria, B.C.

In May, as sort of a pre-North Western PSA Regional curtain-raiser, Victoria CC showed 140 prints, PSA Tops in Photography 1958, in the local library. In the same connection, 120 pictorial and nature slides were shown at Victoria Art Gallery.

ZD Jim McVie had 4 prints accepted in Singapore International, including a bronze medal and H.M. He got 3 slides and 1 print in the Mariners Show at Newport News, Va., all H.M.'s.

Pelle Pete Swensson, Aldergrove, B.C. has sent a 40 print, one man show to Moscow, USSR. Also he has arranged for a Soviet entry to be forwarded from Moscow to the Victoria NW Regional Salon, this June.

SOUTH OF THE BORDER

Editor: J. L. Zakany
V. Carranza 69, Mexico, D.F.

South of the Border

Latin American Photographers & Camera Clubs join this editor in expressing the most sincere condolences on the passing away of our friend & editor of this journal, Don Bennett, FPSA. (Los Fotografos Y Foto Clubes Latino Americanos se unen a este editor, al expresar su mas sincero pesame por la muerte de nuestro gran amigo y editor de este journal, Don Bennett, FPSA, Q.E.P.D.)

Mexico

ENRIQUE GALINDO, Prof. of Photographic Technique at Engineering Faculty of the University of Mexico & head of Foto Club Ingenieros, joined by special invitation, the Society of Photographic Scientists & Engineers of Washington, D. C. (Profesor de

sound to your 8mm movies

back your sound instantly . . . erase and re-record until you are satisfied. Reverse action makes it easy to re-record any part of the sound track.

Then listen critically to your final playback. You hear sound that's bell-clear, rich, and undistorted. Three exclusive Kodak Sound 8 Projector features team up to produce this sound quality.

1. An entirely new kind of recording head. It's made of Alfenol, a major breakthrough in magnetic-metals research. Where previous types of magnetic material wear down in a handful of hours, this new Alfenol head records for thousands of hours without loss in sound quality.

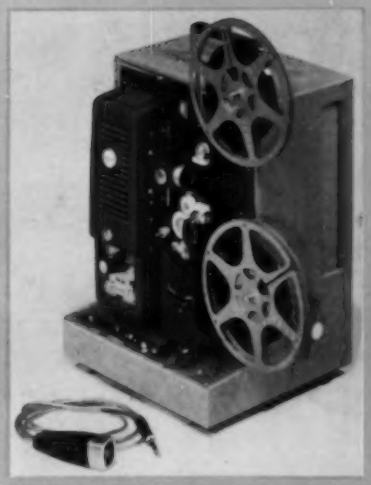
2. A unique new sound drive. It stabilizes sound a split second after you snap on the projector. This unmatched acceleration makes it easy to coordinate sound track and picture for better recordings.

3. A balanced sound system. No distorted high or low frequencies. The amplifier produces peak performance from the 10" x 2" oval speaker built into the projector. (You can also attach an external speaker or play through your hi-fi system.)

A high-low switch lets you project at normal brilliance while you are recording. Lets you switch to full brilliance for performances. Result: much longer lamp life.

With the Kodak Sound 8 you can project at silent or sound speeds, switch instantly to reverse projection, hold "stills" on the screen. Power rewind of a full 400-foot reel takes less than fifty seconds.

Your Kodak dealer has a demonstration sound movie that will let you judge the sound and picture quality of the Kodak Sound 8 Projector for yourself. See him soon to experience this thrilling new accomplishment in 8mm movies.



Kodak Sound 8 Projector with microphone and phono connector cord, ¾-inch f/1.6 Ektanar Projection Lens. Complete in a single case, $345.

Price is list and subject to change without notice.

The more you know about photography . . . the more you will count on Kodak

★ *PICTURE IT NOW— see it again and again*

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

Kodak TRADE MARK

Técnica Fotográfica en la Facultad de Ingeniería de la Universidad Nacional de México, y Director del Foto Club Ingenieros, a invitación especial, se hizo socio de la Sociedad de Científicos e Ingenieros Fotógrafos de Washington, D. C.)

WALTHER BENSER. Famous photographer of Dusseldorf-Oberkassel, Germany, known in Europe as the "Professional Amateur", for his ability to place himself in either's point of view, last March visited CFM, on visit to Mexico in search of photos to add to his lecture "35mm Color Magic," being shown to audiences as large as 4,000 on tour of USA. He criticized slides of the March CFM contest, expressing himself highly of the advance of Mexican Color Photography. (Famoso fotógrafo de Dusseldorf-Oberkassel, Alemania, conocido en Europa como el "Aficionado Profesional" por su habilidad para colocarse dentro del punto de vista de cualquiera de los dos, en marzo ppdo. visitó el CFM, en viaje a México en busca de fotos para su conferencia "Magia en Color de 35mm," que esta siendo presentada ante auditorios hasta de 4,000, en gira por los EE. UU. Criticó las transparencias del concurso de marzo del CFM, expresandose altamente del adelanto de la Fotografía Mexicana a Colores.

CLUB FOTOGRAFICO DE MEXICO, PSA. Its 1st airborne photo tour last Easter Week discovered a new photographic paradise when a special plane flew 22 members to Vallarta Port on the Pacific Coast between Manzanillo & Mazatlán, abounding in human, nature and pictorial motifs. (Su 1ª excursión fotográfica aerea, la pasada Semana Santa descubrió un nuevo paraíso fotográfico, cuando un avión especial llevó a 22 socios a Vallarta, puerto en la Costa del Pacífico, entre Manzanillo y Mazatlán, en donde abundan los motivos humanos, de naturaleza y pictóricos.

J. L. ZAKANY, APSA. His slide "Misty Morn," accepted in 114 Intl. Shows, has been chosen by the National PFA Jury to form part of "Photography in Fine Arts, Exhibit II," opened last may 20th at the N. Y. Metropolitan Museum of Art, to be exhibited 'till Sept. 4th, and then will circulate thru the USA. Was listed 15th in Tops in Stereo finals for 1959. His "Surveying the Flood" has been added to PSA's Tops for 1960. (Su transparencia "Niebla Matinal" aceptada en 114 Internacionales, fué escogida por el Jurado de "Fotografía en las Bellas Artes," para figurar como parte de la misma, inaugurada el 20 de mayo ppdo. en el Museo de Arte de N. Y.; será exhibida hasta Sept. 4, y después circulará per los EE. UU. Quedó en 15o lugar en los Mejores en Estereo 1959. Su "Acuatizando en la Inundación" ha sido agregada a "Lo Mejor en Fotografía de la PSA 1960."

Correction

The Who's Who in PSA Journal Awards listing on page 48 of May issue should read: Who's Who in PSA Journal Awards through 1959.

★ ★ ★ ★ ★ ★

COLOR DIVISION

Star Ratings (Slides)

★ ★ ★ ★ ★

Arthur W. Papke

★ ★ ★ ★

Sam G. Blakesley

★ ★ ★

Gladys L. Baker
Dr. W. Aubry Crich
E. T. Dennis
Edith R. Hogan
Martin E. Kuntz
Betty Moore
Roy Simpson

★ ★

Karin Engstrom
Howard E. Goldstein
Charles Z. Green
Donald E. Hayward
Felix J. Henrion
Louis Key
Virginia Kay
Milt Martin
Charles E. Morris
Eileen Tanson
Donald S. Williams

★

Conrad J. Boilard
Cecelia D'Entremont
Guenter Grote
Louis J. Hoeflinger
George Koscak
Thomas J. Lowe
Rupert Lowrey
Samuel E. Marling
James W. Perdue
Suzanne Ravise
Albert L. Sieg
Rudy Siska
Hazel E. Watson
Wesley Wilcox
Dorothy Ziebach

★ ★ ★ ★ ★ ★

New! Lowest-priced Brownie

MOVIE CAMERA

only $24.50

The record low price on the new Brownie 8 Movie Camera, *f*/2.7, is news—but not the whole story. For this new 8mm Brownie equips you with movie-making features you'd expect only on a much more expensive camera.

A turn of the new exposure-control dial sets the lens in a split second for color-bright movies.

New viewfinder. **You aim through the enclosed optical finder. The new shutter-release bar, wide enough for at least two fingers, gives you a steadier camera grip for steadier movies.**

A new folding crank winds up the motor—fast! The motor cuts off at the end of its full-power run. No film wasted by a slow-running drive!

To load, you just drop the film into a new grooved threading path. The footage meter resets itself automatically after loading, measures footage with a new degree of accuracy.

Add it all up—all-time low price, a raft of new features. Combined, they make the Brownie 8 Movie Camera, *f*/2.7, a whale of a buy. See it at your photo dealer's soon.

Prices are list and subject to change without notice.

★ ★ ★ ★ ★ ★

COLOR DIVISION

Star Ratings (Color Prints)

★ ★ ★

Larry Young

★ ★

Ed Willis Barnett

★ ★ ★ ★ ★ ★

NATURE DIVISION

Award of Merit

★ ★ ★ ★ ★

Grant M. Haist — Louis B. Ziegler

★ ★ ★ ★

William J. Barrett — Ralph Sims
E. J. Flesher — Grace A. Thompson
William W. Hawkins — Elvin Warrick
Alvin Richard — Don Williams

★ ★ ★

Donald D. Burgess — Edwin C. Park
Robert G. Byrne, Jr. — Betty Randall
Hanna Gnittke — Henry N. Ruttan
Lothar Gnittke — Mary T. Scott
Felix J. Henrion — W. F. Scott, Jr.
Edith R. Hogan — Kenneth H. Smith
John D. Lampart — William H. Trent
Charles Richard Osborn — Wardene Weisser
Elsie B. Westmark

★ ★

Mary W. Brown — John F. McGowan
W. Aubrey Crich — Elmer F. Miller
Ruth Fields — Betty Moore
Kenneth Fink — Charles E. Morris
Grace I. Gish — Kenneth Olson
John R. Hogan — Hy C. Priester
Harold Johnson — G. Fred Richen
James T. Johnson — Wesley Wilcox
Sadie E. McGillis — Jim Yoakum

★

Isobel M. Baldeschwieler — K. L. Hanson
Ed Willis Barnett — John Kohout
Margery S. Barrett — Wilfred J. Lachapelle
Ruth A. Cordner — J. M. Matthews
Nicholas De Wolf — Philip Rossman
Karin Engstrom — Donald S. Teague, Jr.

★ ★ ★ ★ ★ ★

STEREO DIVISION

Star Ratings

★ ★ ★

Robert A. Haven

★ ★

Ron Fredrickson

★

Charles R. Osborne — W. H. Thomas

★ ★ ★ ★ ★ ★

You Can be a Winner

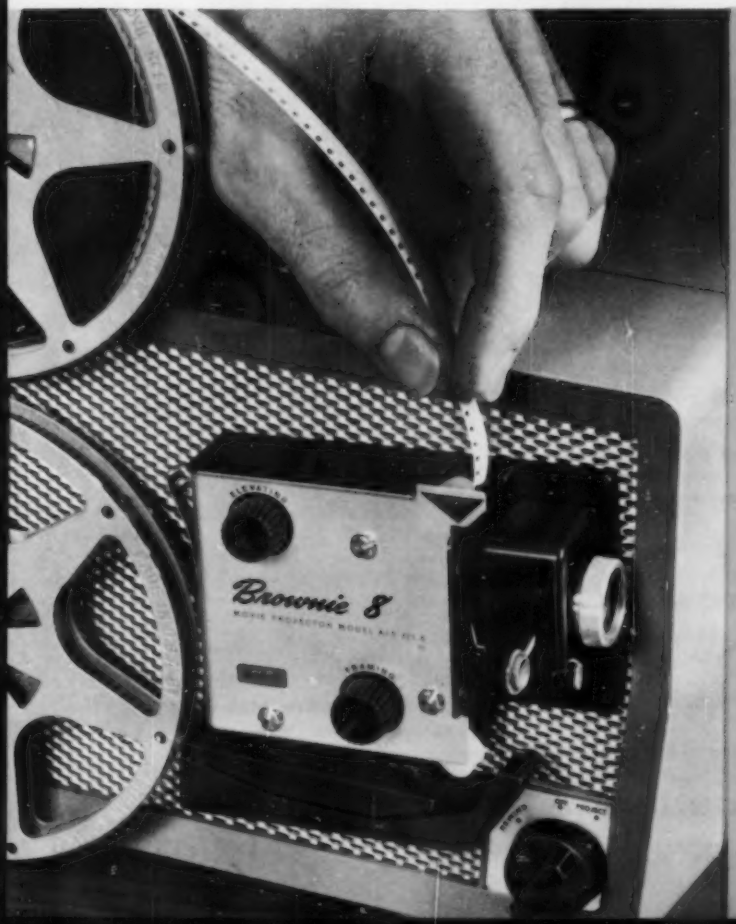
The Newspaper Snapshot Awards will offer an all time high of $25,575 for the best amateur pictures in either black and white or color.

Watch your local newspaper for details. Any picture taken after July 1st, 1959 is eligible. Classes of the contest are: 1. Babies and Children; 2. Activities; 3. Scenics and Tabletops; 4. Pets and Animals.

Firth Contest

Like to get out in the great outdoors with your camera? Just being out can be its own reward after being in the office all week, and now a new Pictorial Division activity gives you a very good reason for shooting that landscape you have been thinking about, but have just never gotten around to doing.

The Firth Landscape Contest named for Tom and Caryl Firth, FPSA's who have made this activity possible is dedicated to getting the photographer outdoors and recording the beauties of nature. There will be four of these contests, one each year, and they will be judged at the national conventions. The first contest will be judged at Houston this fall. The winning photographer will receive a plaque given by the Firths and the Pictorial Division will give trophies and ribbons.



New! Automatic Brownie
MOVIE PROJECTOR
only $54.50

Threads itself! All you do is feed the film into the film slot—and relax. The Brownie 8 Movie Projector (Model A15) automatically threads the film through the projector gate and onto the take-up reel. Nothing could be easier!

With the Model A15, you can project your 8mm movies four feet wide. The picture is sharp, clear—and *extra* bright, because of a new projector lamp with built-in reflector.

Reel capacity is 200 feet for 15-minute shows. A single knob controls forward projection and rapid rewind. And the projector *never* needs oiling.

See the automatic Model A15 in action soon at your photo dealer's. It treats you to luxury projector features at a Brownie-low price.

The more you know about photography ... the more you will count on Kodak

EASTMAN KODAK COMPANY
Rochester 4, N. Y.

★ *PICTURE IT NOW—see it again and again*

Kodak
TRADE MARK

Camera Clubs

Editor: Henry W. Barker, FPSA
392 Hope St., Glenbrook, Conn.

Club Project Creates Widespread Interest

My inspiration for this month's column came from a double page spread in the Cleveland Plain Dealer Rotogravure Magazine which described a month long exhibition during March at the Cleveland Garden Center, and which featured outstanding nature photographs by members of the Photographic Club of The Kirtland Society.

This active group of 47 photographers chose their name in honor of Jared Kirtland, doctor and naturalist, who in 1837 settled what is now known as Lakewood, Ohio. Since their first meeting in 1942 this club, guided by several devoted PSAers, has dedicated itself to helping others appreciate the beauties of nature rather than engaging in the common club pastime of seeing which member can end the year with the most points gained from club competitions.

Viewing their handiwork are PSAer Richard Klein, Chairman of the show, and Mr. and Mrs. William Klamm.

There was standing room only at the two illustrated talks given in the spacious auditorium at the Center. On March 13th Morton Strauss, (above left) President of the Camera Guild of Cleveland and Nature Program Chairman for the coming PSA Convention in Houston, was the speaker. On March 27th Henry M. Mayer, FPSA, (right) widely known as "The Dean of Nature Photography," put on the show.

In addition to the prints shown there were four specially designed cases which displayed transparencies. Hundreds of visitors were attracted to the show through excellent publicity prepared well in advance by the group.

Pileated Woodpecker — Richard P. Klein

What this club has accomplished should be an inspiration to others to put their talents to work. Your project need not be a nature program—many communities stage an annual Arts Festival which should open the way for a pictorial exhibition with illustrated talks on various branches of photography.

"Take-off" — Martha Kenyon

Regardless of the subject you choose as a community project the results are sure to be most rewarding.

PSA Cuts

Electros of the PSA Official Seal are now available for use of members in the sizes shown below. They can be used for stationery, membership cards of affiliated clubs, labels of PSA-Approved salons, print stickers and similar uses. All have the word "Member" as a part of the cut and 9B has the words "Sustaining Member". Regulations on use of the seal require that these words be included. These cuts are long-wearing copper electrotypes and should last for thousands of impressions.

MEMBER
No. 12

Cuts Actual Size

MEMBER
No. 9

MEMBER
No. 7

MEMBER
No. 5

Prices

No. 5	$3.25	No. 9	$3.75
No. 7	3.50	No. 12	4.25

How To Order:

Send your money with check or money order to Headquarters. Shipment will be made from stock.

Photographic Society of America
2005 Walnut St.,
Philadelphia 3, Penna.

psa news

Pittsburgh Chapter Meeting

The June meeting of the new and thriving Pittsburgh Area Chapter is to be held June 11 in the ballroom of the Pittsburgh Athletic Association.

The meeting will start with a cocktail hour at 6 and dinner at 7. Its Charter will be presented to the Chapter by Frank A. Noftsinger, APSA. The new officers will be elected and installed following the Chapter presentation.

Roy Mumma, PSA Area Representative, will give an illustrated talk on his recent trip to Lapland and other out-of-the-way places. A large attendance is expected.

"Nature Nate's Corner" Dedicated.

The Arcadia Sanctuary Nature Photography Program, honoring Alfred "Nature Nate" Renfro, FPSA, pioneer nature photographer and journalist, was officially dedicated Sunday, April 24th, at Northhampton, Mass.

The center of activity was the "Bird Portrait Studio" reputedly the first of its kind in the U. S. and a symbol of cooperation between joint members of the Mass., Audubon Society and PSA Nature Division.

Edwin A. Mason, Sanctuary Director, acting as M.C., turned over the proceedings to Charles Crowley, PSA Nature Division representative who spark-plugged the project. William A. Barrett,

PSAers William Barrett and Charles Crowley together with officers of Mass., Audubon Society and the Director of Arcadia Sanctuary are justly proud of their completed project.

APSA, and PSA Area Representative extended greetings and urged all members to use the studio and the living nature museum which is the Santuary itself.

Guests were present from all western Mass., camera clubs, Brattleboro, Vt., and Hartford, Conn.

Raife G. Tarkinton receives new appointment

One of the country's leading experts in military photography and a PSAer since 1946, Raife G. Tarkington has been appointed associate head of the applied photography division of the Kodak research laboratories.

For his contributions toward the advancement of aerial photography while stationed at Wright Feld, Dayton, Ohio, Tarkington was awarded the Legion of Merit.

He was an air force lieutenant colonel and assistant chief of the photographic laboratory at Wright Field when he left military service and returned to Kodak in 1946.

Detroit In Pictures—A Project

The Greater Detroit CC Council and the Detroit Historical Museum are co-sponsors of a project, the purpose of which is to record Detroit in pictures for posterity. Any photographer may enter. Prints will be judged in category on the basis of: 1—potential historial value; 2—photographic quality. For information on rules, awards, etc., write: Detroit in Pictures Project, The Detroit Historical Museum, 5401 Woodward Ave., Detroit 2, Mich.

Steam Locomotives still run in Michigan

PSAer Haviland F. Reeves, President of the Michigan Railroad Club announces a three day excursion, July 1-4, via Canadian National and Ontario Northland from Windsor, Ont., to Moosonee—about 1800 miles. If plans go well, this will include some running back of steam. In any case the trip will interest photographers. To be sure of space make reservations through Haviland F. Reeves, Fox Theatre Bldg., Detroit 1, Mich.

Obituary

Elizabeth Fish

Elizabeth Fish, wife of John I. Fish, FPSA and Conventions Publicity Director, passed away suddenly on May 12th in Rochester, N. Y. Elizabeth, a very active member of PSA for several years, will be greatly missed by all who knew her.

Kodacolor Prints to cost less

Reduction in price of popular-sized Kodacolor Prints has been announced by Eastman Kodak Company.

The familiar 32-cent, 3X print from all sizes of Kodacolor negatives now lists at 29 cents; the 23-cent, 2X size from 828 and 135 film will be 20 cents.

At the same time Kodak announced that the 3X-size prints will be wearing a new look. They'll have the same high gloss, ferro-typed finish that has made the smaller size prints so sparkling.

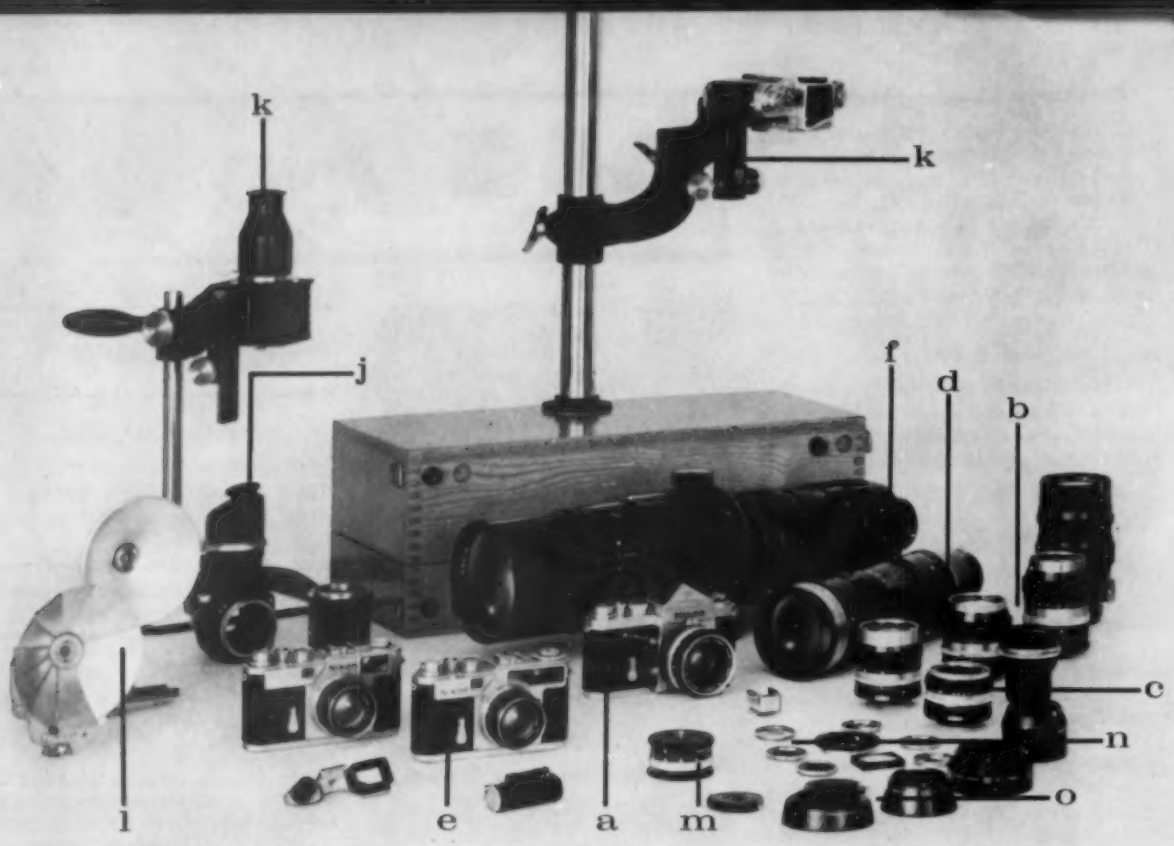
Save postage!

The small changes in postal rules have not been made clear to all of us.

It used to be that we could attach a letter only to the outside of a parcel post package and put stamps on it for the first-class postage. This rule has been relaxed to the extent that the letter may now travel inside the package provided a notice is written or stamped on the outside and additional postage is affixed. When mailing photographs and a manuscript it is not necessary to make a combination package and then pay first class on both parts. Put your letter and manuscript in with the prints and weigh it all together. We get many packages mailed this way. Don't waste your money.

PSA Calendar

June 10-12	Victoria Regional Convention. Reg. Chmn.: Miss Dora Payne, 2223 Oak Bay Ave., Victoria, B. C., Canada.
June 17-19	Wichita Regional Convention. Reg. Chmn.: Mrs. Mildred Blehm, Box 1494, Wichita 1, Kan.
June 24-26	Montreal Regional Convention. Reg. Chmn.: Mr. Horace Willmott, 15 Drayton Rd., Pointe Claire, Quebec, Canada.
Oct. 11-15	Houston National Convention, Rice Hotel. Chairman: L. J. Wallace, P.O. Box 1724, Houston 1, Texas.



NIKON offers you the complete

As you look back and examine the growth and advancement of 35mm photography, it is clear that the last ten years were the years of greatest progress.

Within that period we saw the transition of the basic rangefinder camera into a responsive, fast-handling instrument. We saw the addition of more and more desirable, functional features contribute to its handling ease and versatility: the single-stroke film transport, the rapid rewind, the non-rotating speed dial, and many others. And we witnessed the ingenious innovation of the built-in universal viewfinder, automatic parallax correction, compensated flash synchronization, and a host of advances in shutter design and mechanics—and the electric motor drive and coupled exposure meter.

Probably the greatest step forward was achieved in 35mm optics. Lens designs, which would have been considered impossible a few years prior, were successfully developed to meet the special needs of the '35'. These lenses combined high speed and high resolution to a degree that was unprecedented, and gave new impetus to the technique of 'available light' photography.

Then — and in the last year of the decade — came the startling development of the first fully automatic 35mm reflex with instant-return mirror and instant-reopen diaphragm. And with it came the design of a totally new telephoto zoom lens, the first of its kind ever developed especially for 35mm photography.

It is no mere coincidence that these were the years in which Nikon rose to prominence in 35mm design. For Nikon contributed much to this progress. Review the major developments in 35mm photography over the past ten years, and note how many of them originated with Nikon, and how many of them are identified with Nikon in concept or execution.

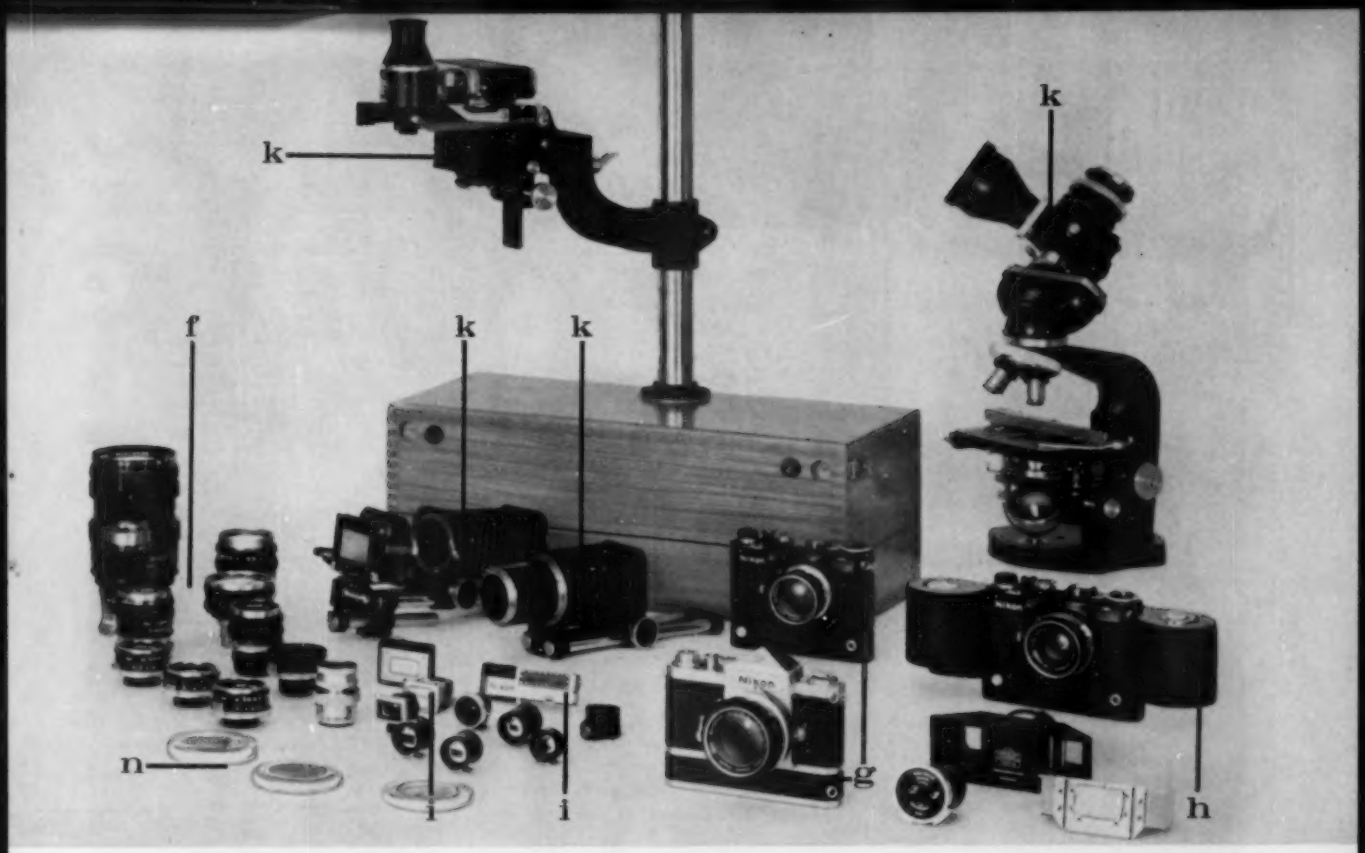
Today, as a result, Nikon offers you the most advanced, the most complete approach to 35mm photography.

a. **NIKON F AUTOMATIC REFLEX '35'** This is the world's only 35mm single-lens reflex with instant-return automatic mirror, instant reopen automatic diaphragm and instant-action depth-of-field previewer. Equipped with Auto-Nikkor f1.4, it has the brightest finder of any reflex, and is the only one with a lens of such speed and quality. Because the mirror and diaphragm actions are fully automatic, the finder image never blacks out, never dims.
NIKON F with f1.4 Auto-Nikkor, $375; with f2, $329.50.

b. **AUTO-NIKKOR LENSES** The Auto-Nikkor lenses couple directly to the internal automatic diaphragm action of the Nikon F. This automatic action is so precise and gentle that the 'taking' aperture may be set between-stops without ever shifting. And the lenses may be interchanged without the need for any previous setting or adjustment of either the lenses or the camera. Auto-Nikkor lenses presently range from 28mm to 135mm—plus an automatic Telephoto Zoom.

c. **AUTO-NIKKOR f1.4** The availability of this remarkable lens with automatic diaphragm for the Nikon F, brings advantages beyond even its desirability for 'available light' photography. Always wide open for viewing and focusing, the Auto-Nikkor f1.4 makes the Nikon F finder the brightest of any reflex, and provides a comfort, an ease and speed of handling never before asscociated with any reflex.

d. **AUTO-NIKKOR TELEPHOTO ZOOM** This phenomenal lens is continuously variable from 85 to 250mm for more than 165 focal lengths. The change is simple, fast and smooth. You shift the selector ring, and observe the effect through the reflex finder. When you see the image at the magnification desired, you shoot. That's all there is to it.
The telephoto Zoom focuses from 7½ feet to infinity. Once in focus for subject distance, it remains in sharp focus at every focal length. The lens is always at f/4 (wide open) for focusing and viewing and automatically stops down for the exposure; then instantly reopens to full aperture. $595.00



approach to 35mm photography!

e. **NIKON SP RANGEFINDER COUPLED '35'** This is the world's only rangefinder-coupled 35mm camera with a viewfinder system for six focal length lenses. You can choose and use interchangeable lenses easier and faster than with any other rangefinder '35'. The grouping of the SP controls is so well thought-out that you can advance the film, focus the lens and trip the shutter with three fingers of one hand—in as little time as it takes to say: 'advance—focus—shoot'.

NIKON SP with f1.4 Nikkor, $375; with f2 Nikkor, $329.50.

f. **NIKKOR LENSES** These lenses originally came to the attention of 35mm camera users because of their almost incredible resolution — even at maximum apertures. Their quality is still unsurpassed. And today, they are regarded as the finest in 35mm optics. There are 28 Nikkor lenses, ranging from 21mm to 1000mm. Among them are the Auto-Nikkor lenses with automatic diaphragms for the Nikon F.

g. **ELECTRIC MOTOR DRIVE** This unique, battery-operated accessory brings automatic fire-power to Nikon photography. You can shoot singles or bursts of two or more, right through an entire 36-exposure load—from camera position or remotely—at a rate of up to 3 per second. Aside from its special uses in sequence photography, time-lapse and motion studies, the Nikon electric motor drive will prove invaluable to help you get the 'great' pictures that always seem to occur after the initial exposure is made.

For Nikon SP—$199.50; for Nikon F—$219.50.

h. **250-EXPOSURE ELECTRIC MOTOR BACK** This unique accessory offers all of the operational advantages of the Electric Motor Drive plus the added versatility of interchangeable daylight cassettes that hold sufficient film for up to 250 exposures.

i. **COUPLED EXPOSURE METERS** For the Nikon SP—a shutter-coupled meter that indicates the correct f-stop for any shutter speed setting, or selects the correct shutter speed for any selected f-stop. ASA 6 to 3200. $23.50.

For the Nikon F — the only meter that couples to both diaphragm and shutter. Either setting may be pre-selected, and the other determined. ASA 6 to 4000. $34.50.

4X Booster-Amplifier for either, $6.95.

j. **PRISM REFLEX HOUSING** Brings reflex focusing and viewing to the Nikon SP, using 180, 250, 350 and 500mm lenses. Image-erecting prism finder is equipped with 4.3x magnification eyepiece. Coupling cable synchronizes reflex mirror action with camera shutter. $129.50.

k. **COPY, MICRO AND ASTRO EQUIPMENT** A variety of units and outfits, bellows attachments and extension tubes for close-up photography — covering a wide range of magnifications for every possible need. Also microscope and telescope attachments for photomicrography and astro-photography.

l. **FLASH UNITS** A choice of two battery-capacitor (B/C) units: a fan-fold cordless unit that makes direct contact with camera terminals equipped with swivel head for bounce flash —and a heavy duty unit with provision for extension flash.

m. **MULTI-LENS PANORAMIC HEAD** Permits you to take a series of slightly overlapping pictures to form a continuous panoramic scene up to a full 360° circle. Head is calibrated for use with any Nikkor or Auto-Nikkor lens from 28mm to 135mm.

n. **FILTERS AND POLARIZING SCREEN** Nikon filters are made of the finest optical glass, precision-ground and polished to plano-parallel flatness. All filters are hard-coated on both sides. Each is supplied with a transparent, polystyrene holder.

o. **SNAP-ON LENS AND HOODS AND CAPS** Attach as easily as 'slip-on' units, and hold as securely as 'screw-in' units, without the disadvantage of either.

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In Canada: Anglophoto Ltd., Montreal, P.Q.

PSA
Recorded Lecture PROGRAM

The Recorded Lecture Program offers the following programs for your club. Each program consists of a set of 2x2 slides and a tape-recorded commentary, average length, 50 min.

•

28. Color Portrait Photography, by Robert G. Speck. This Lecture is a definite must for the 35mm Color Enthusiasts. In it is also much of interest to those wishing to improve their B & W portrait work. The details of equipment, exposure, posing, draping, background, lighting, color makeup, and imagination are all covered. 73 color slides with a 55 minute commentary.

•

24. Creative Portraiture, by J. M. Endres, FPSA. This Lecture is an excellent companion for #28 (Speck) for the monochrome workers in your club. The color workers will also learn much from "Jake's" use of mood, pose and props. The monochrome Blue Viewing Glass is used and demonstrated. 70 slides with a 54 minute taped commentary.

•

17. Filters, Facts, and Fun, by A. C. Shelton, APSA. The title of this RLP Lecture speaks for itself. This noted camera club speaker gives an outstanding and expert discussion on the way filters work. And, what they are used for. Your club's members will find this lecture 50 minutes well worth while.

•

3. Outdoor Photography, by D. Ward Pease, FPSA. This Lecture will help you search for better landscapes, marine, and architectural pictures. The newcomer as well as the old timer pictorialists will enjoy the fine examples of outdoor photography. A 50 minute tape is accompanied by 37 slides of monochrome prints.

•

For a complete list with full description of all RLP Lectures see the latest RLP Catalog.

Orders for Lectures should be mailed at least 45 days before the date of showing.

A service charge is made for each lecture. For clubs which are members of PSA, the service charge is $5, plus a deposit of $20 which is returned upon request. Your first order should be accompanied with a $25 check, to cover deposit and service charge.

Clubs which have not used a lecture and want to order, or want information, or a catalog should write to:

Director of Distribution

Nelson L. Murphy
445 Allison Ave.,
Washington, Penna.

Recorded Lectures

Editor: Charles L .Martin
Route 3, Box 779
Excelsior, Minn.

New RLP Lecture Available September 1st.

You must be interested in Photography or you wouldn't be reading this magazine!

Since you are interested in Photography you must be interested in Color and/or B & W! And, by the same token, you must be interested in composition, fine techniques, balance in your pictures, and in lighting.

Since this is true, then the PSA Recorded Lectures Program's newest Lecture, RLP #31. "Compositionally Speaking" by Thomas Limborg, FPSA, should be on your "Must" list. Copies of this Lecture will be available for your club for Fall scheduling.

There are several features of this Lecture which make it most desirable for showing at "Ladies Night," or other special meetings. For not only is it composed of some of the finest pictures we have ever seen, but the brilliantly colored slides bring out techniques we didn't dream existed. For those individuals who like their lectures on the technical side, there is enough in this Lecture to satisfy them without letting the technical expressions or demonstrations overweigh the sheer enjoyment of seeing some very wonderful pictures.

Tom covers the basic principles of composition using lines, angles, squares, circles, and tonal difference. But, he starts making you think a bit more when he shows how textures, colors, and sizes of objects also become part of the composition.

Particularly interesting is his demonstration of the elements of composition as controlled by lighting, and his explanation of how to arrange composition on the enlarging easel and on the ground glass.

We must stress that this is a Lecture aimed at the needs of all photographers. Tom's salon pictures include 35mm color slides, monochrome prints, and color prints. There are many extras such as Tom's method of making composite prints and some of his famous self portraiture characters in color.

We would like to suggest that you have your group go back and listen to Tom's ideas at least once more. We tried this ourselves and found it to be most instructive. It is amazing how much more you will learn by doing this.

It is difficult in any review not to overwork some rather tired phrases. But, regardless of the descriptive adjectives we might employ, it would be difficult to do justice to this fine Lecture. The slides are technically perfect; the tape is without mechanical flaw; and the narration is most interesting. There is a great deal of humor in Tom's slides. And in the sneak preview we ran with a couple of non-camera-wise ladies present, we were most intrigued to see that they enjoyed the Lecture as much as the most advanced amateur present.

The slides have a terrific impact, which can be expressed inadequately in words. They must be seen to be appreciated. Tom has spent endless hours in the preparation of this Lecture. We think you'll agree with us that it is his finest presentation yet. Remember, this Lecture will be available for your club's Fall Programs on a first come first served basis.

Reviewed by

William G. McClanahan, APSA.

IF YOU ENJOY Photography...
IF YOU WANT TO TAKE Better Pictures...
IF YOU WANT TO KNOW Other Photographers...
You are invited to attend the
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JUNE 24-26, 1960
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Prize-winning photo taken by O. Winston Link with view camera at 1/200th, 28 No. 2 Sylvania flashbulbs and 3 No. 0 Sylvania flashbulbs.

O. Winston Link, New York City

"No photographic lighting source can equal flashbulbs for flexibility, portability, or creative freedom," says O. Winston Link.

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Wichita Regional Convention

LASSEN HOTEL — WICHITA, KANSAS — JUNE 17-19

A Jam-Packed Weekend for Photo Fans

Dr. Ronald Greene

There's a full schedule planned for those who are fortunate enough to attend the PSA Regional Convention in Wichita, Kansas, during the weekend of June 17, 18 and 19. The convention will officially start at 6 o'clock Friday evening, June 17, in the Lassen Hotel. Those arriving early will find the registration desk open, along with the various dens, and a fine exhibition of the accepted prints from the Wichita International Salon.

On Friday evening, stereo slides from the Salon will be shown at 7:30, with nature slides scheduled an hour later; then a coffee break will whet everyone's appetite for the pictorial color slide showing at 9:45.

HOW-TO-DO-IT PROGRAMS

Saturday activities will start early with the N4C breakfast at 7:30; the registration desk, the dens, and the Print Salon will open at 8 o'clock. During the early hours, Ansco's James McMillion, Jr., will fire the opening shot of the convention in Saturday's schedule with a lecture entitled "Color Photography at Night." In his program he will explain the tools, techniques, and procedures necessary to obtain outstanding results in this fascinating area of photography.

At 10:30 Saturday morning there will be a double feature, and convention-goers will be able to choose between a panel discussion of the slides rejected in the Wichita International Salon, and Dr. Ronald A. Greene's "Modern Approach to Paper Negatives." Dr. Greene comes all the way from Laguna Beach, California, where he is well-known in West-Coast photographic circles. Immediately following, the Heiland Division of Minneapolis-Honeywell will have a representative on hand to talk about the latest tricks in flash picturetaking.

Then there will be a Fellowship Luncheon at 1 o'clock in the hotel ballroom, which precedes a star-studded afternoon program lineup. First of all, Helen Erskine, of Chicago, will present her lecture entitled "Photographing Glass in Color—and 3-D." During the same time there will be a panel discussion of the prints rejected by the judges of the Wichita Salon.

About mid-afternoon, Kodak's Jack Streb will be on deck with an inspirational color-slide program tailored to give an insight into the potential of modern films. His program, "Color Unlimited—by Available Light," will give tips on the use of High-Speed Ektachrome and will afford a bumper crop of ideas to midwest amateurs.

Murray Gill Electric Plant. Jack Barkus

Helen Erskine

A cocktail hour at 5:45 will be followed by a banquet; afterwards, Dr. J. Stanley Reifsneider will show his "Colorado River Adventure."

PICTURETAKING FOR ALL

Sunday morning's events will be strictly on the informal side, with picturetaking opportunities for everyone. A de luxe-model session will start early at 9 o'clock in the hotel ballroom, with glamour and character models on hand, complete with props and lighting setups. Also at 9 o'clock, buses will leave the hotel for a double-feature field trip which will include an oil refinery and a steam generating plant.

Also on Sunday, perhaps for those who may have forgotten their cameras, there will be a repeat showing of the stereo, nature, and color slides from the Wichita Salon.

Sunday afternoon will see the conclusion of the 1960 Wichita Regional PSA Convention. Don't miss this opportunity to learn from the experts . . . enjoy meeting old friends and new . . . a weekend of photo fun in Kansas. Don't delay: for information and advance registration blanks write today to Mildred Blehm, P. O. Box 1494, Wichita 1, Kansas.

"Monkey Love"—taken by Alice H. Elmer, Neptune, N. J. with a 4 x 5 Speed Graphic using a Grafmatic Film Holder

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THE SUPER SPEED GRAPHIC WITH REVOLUTIONARY GRAFLEX 1000 SHUTTER . . . makes possible the shortest, sharpest exposure times in the history of big negative cameras. Has optimum sync with "M" type flash bulbs through a true 1/750 second; with "X" electronic flash through a true 1/1000 second! All camera controls are man-size and conveniently located. Built-in combination lens shade and filter holder affords an "easy to grasp" method of cocking the shutter. The 4 x 5 Super Speed Graphic costs little more than an ordinary between-the-lens camera, only $449.50. See and try it today. Ask your dealer for a demonstration. Graflex, Inc., Rochester 3, N. Y. A subsidiary of General Precision Equipment Corporation.

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Bienvenue from Montreal and an invitation to all photographers

Montreal Regional Convention

QUEEN ELIZABETH HOTEL MONTREAL, QUEBEC JUNE 24, 25, 26, 1960

Bienvenue is the word of welcome and invitation to all to the Montreal Regional Convention, to be held at the famed Queen Elizabeth Hotel in a city which is a paradox of the very old and the very new. Top flight speakers will cover topics of interest to all.

Special Features . . .

★John Doscher, FPSA, FRPS, owner and director of the Country School of Photography in picturesque South Woodstock, Vermont, will give his comprehensive "Short Course to Color" at 3:15 p.m. on Saturday, June 25. Two large screens will be used to help the audience make direct comparisons.

The convention banquet is scheduled for 6:30 p.m. on Saturday and John Doscher will be the featured guest speaker. He is an accomplished teacher, a famous judge, and a vivid personality. Everyone who knows John Doscher loves him and those who know him well refer to him as "Father John," for he is always willing to help everyone with their photographic problems.

Whether a beginner, an advanced amateur, or a professional, his "Short Course" will be stimulating and beneficial to those seeking to improve their photographic and artistic skills. John's approach happily encompasses the best elements of experimental, contemporary, and traditional photography—both black and white and color.

★Charles A. Kinsley, FPSA, will be featured at 8:00 p.m. on Friday, June 24 with his exciting "Alsakan Camera Trails," illustrated with colorful slides made during a recent trip to the 49th of the United States.

"Alaskan Camera Trails" is a photographic tourist's eye view of some of the better known areas of Alaska. In 15 days of concentrated picturetaking, Charles Kinsley has created a photo story which gives a rare firsthand look at this fabulous land.

His slide show ranges from pictures of salmon fishing and glacier explorations to totem poles and Eskimo dances. It is an honest appraisal of some of the photographic possibilities within Alaska.

It describes the life, customs, and contrasts of the land and, as you would expect from an experienced photographer, is packed with photographic tips for all travelers.

Programs For All . . .

Friday, June 24

The principal events on Friday afternoon include a 30-minute color film preview of the St. Jean Baptiste Parade; judging for the print of the year of the Interclub Print Competition; "How to Make Travelogues," by Esther Cooke, APSA, of Albany, New York; and at 3.30 p.m., the St. Jean Baptiste Parade.

Saturday, June 25

There will be a tour of the National Film Board Studios in the morning and a talk by Wally Gentleman on "Special Effects." Mary Ferguson, APSA, of Toronto, will present her "Nature Photography, Science or Art"; Earle Brown, FPSA, from Detroit, gives his "Putting Quality into Your Prints"; Cliff Pugh, APSA, Toronto, will show "People As I See Them."

After lunch, Jack Ruddell, Toronto, presents "Time Lapse Photography"; Jack Englert, APSA, from Rochester, combines slides and movies in his "Camera on Nature"; and Lowell Miller, FPSA, Rochester, will tell why judges reject photographs in his "Hang That Print." A dance and Quebec Folk Dancing are scheduled for 9:00 p.m.

Field Trips To . . .

On Sunday, there will be field trips to St. Joseph Shrine, with return via Mount Royal Lookout; to the Botanical Gardens; and to St. Helen's Island, with lunch at Helene de Champlain Restaurant and return via St. Lambert and Victoria Bridge.

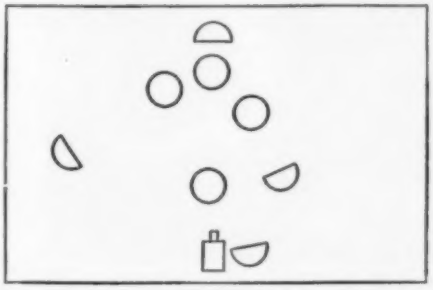
The Queen Elizabeth Hotel is offering a special room rate to the Convention guests. The rates will be $10 single and $14 double, all rooms are air-conditioned, have private bath and TV no extra charge for parking to registered guests. Make reservations early and direct to the Queen Elizabeth Hotel, Montreal, Quebec. In making reservations mention that you are attending the PSA Regional Convention.

HOW WOULD YOU HAVE LIGHTED THIS PICTURE?

NEWS PHOTOGRAPHER LARRY GEORGE DOES SOME SHARP SHOOTING WITH G-E No. 5 FLASHBULBS

"My assignment was to photograph the actors in a high school Western play," writes staff photographer Larry George of the Indianapolis News. "I wanted a picture that would capture the mood of the play and show the principals in some dramatic way.

"It was late at night, during rehearsal. The only existing light came from a few overhead lights on stage. I decided G-E No. 5 Flashbulbs would be perfect for the job. I placed four of them on extensions, all sync on camera... three on the background group and one side-lighting the principal subject in the foreground.



"My camera was a 4x5 Speed Graphic with wide-angle lens, placed at floor level. Exposure 1/50, f22. G-E No. 5's again proved to be the perfect solution to a tricky lighting problem."

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GENERAL ELECTRIC

South Africa Welcomes the Goldmans

By Dr. A. D. Bensusan, FRPS, FPSA

Arrival in Lourenco Marques

Photographers from the Photographic Club of Lourenco Marques were on the dockside to welcome Robert and Edna Goldman as they stepped ashore in Southern Africa.

They spent several days travelling the Kruger National Park Game Reserve and were fortunate in being able to see and photograph all manner of wild game including a herd of elephants which crossed the road in front of their car.

A reception awaited them on arrival in Johannesburg at the home of Betty and Kin Bensusan and representatives of local photographic clubs and members of the Press were there to meet them.

Early the following morning PSA member Gordon Maddox guided them on a tour of a Witwatersrand Gold Mine and they returned in good time to get ready for the meeting that evening of photographers from nearly all the photographic clubs of the Transvaal.

Meeting in Johannesburg

Three hundred and twenty people packed Johannesburg's Medical School auditorium. Chas. Knowles–Chairman of the Motion Picture Division of the PSSA, and Vice-President of the Johannesburg Photographic Society, was in the Chair and after welcoming Bob and Edna Goldman to 'the City of Gold' he spoke of the benefits to photography of a national body such as PSSA and he thanked the Camera Pictorialists of Johannesburg for arranging the meeting.

Robert J. Goldman was warmly applauded as he addressed the gathering and brought messages of good will from Officers and members of PSA. He spoke of our great hobby which should never become a 'business' and he paid tribute to those who had rendered great service to their respective communities and had increased the bonds of friendship between photographers of the two nations.

Bob and Edna then presented their tape and slide programme on 'Holiday in Japan' and many of the slides were applauded by the audience.

The presentation of this programme was warmly received and it gave members renewed enthusiasm and ideas.

After a short intermission Robert Goldman officially launched the Photographic Foundation of South Africa and a presentation was made to Bob and Edna of a limbuia carved buck suitably engraved and with PSSA crest.

Drive is launched by Bob and Edna

On March 15th, 1960, some 320 people from the photographic clubs of the Transvaal gathered at the Medical School auditorium in Johannesburg for an address by the President of the Photographic Society of America–Robert Goldman. This was followed by a programme 'Holiday in Japan' by Robert and Edna Goldman.

After these proceedings, Dr. A. D. Bensusan–Chairman of the Photographic Foundation of South Africa–addressed the gathering and made a statement on behalf of the Committee of "Life of Our Nation, Ons Volk Ons Land" as follows:–

"It might be said that we are pointing a finger at Fate in the launching of our S. African Photographic Foundation on this night. Was it not the Soothsayer who warned Caesar to beware of the 'Ides of March'?

No more appropriate occasion could have been chosen than this evening, and certainly no more appropriate personality than Robert Goldman–President of the Photographic Society of America–to launch this great new venture in our Photography.

In this historic year of Union Jubilee, we are fortunate in having Government backing for the production of the official photographic exhibition for Union Festival, namely "The Life of Our Nation, Ons Volk Ons Land" exhibit. This has already been described as 'the greatest photographic exhibition of our times' and it should create tremendous public interest in it's tour of the seven centers of the Union. This great show has 250 pictures mounted on their own screens and with their own lighting units. This has been achieved only by very hard work over the past eighteen months, and at present it is entering it's final stages in production. I must emphasize that the work has been undertaken by voluntary workers who are dedicated to 'the cause of photography,' J. Gordon Maddox (Technical Adviser), A. Rosewitz (Secretary-Treasurer) and Dr. and Mrs. Sergay (Cinematography).

A public admission fee is to be charged, and the entire proceeds will be devoted to the establishment of a Photographic Foundation in South Africa for the furtherance of Photography and Cinematography. In this way a considerable sum of money will accrue.

The meaning of 'Foundation' must be accepted in it's broadest sense. In the years ahead we hope to construct a building with Museum, Library, Projection and Display rooms, Studios, Dark-rooms and so on where photographers can enjoy their pursuits and the public can appreciate the results.

The time is not yet ripe for this undertaking, and in the meantime interest will accrue from the investments and it will be utilized for the photographic activities of our country in the form of travel grants, sponsored publications on photorgaphy, visiting lecturers and in fact any manner which it is estimated will bring eventual benefits to Photography and Cinematography in our land.

I must mention that I shall personally act as a Trustee, and you may rest assured that the objects of the Foundation in it's broadest meaning will be fulfilled. We shall work in closest harmony with the Photographic Society of Southern Africa.

I am confident that the Foundation will bring to the photographers of our land, great progress and a greater harmony for it has been built up on a solid structure of experience gained in

the establishment of PSSA itself. This is perhaps the greatest step forward ever taken in the long history of photography in our land and it's future success will undoubtedly be assured."

Robert Goldman—President of the Photographic Society of America then announced that he had much pleasure in associating himself with this movement, and thereupon handed the Savings bank book in the name of the Foundation, to Dr. Bensusan for safekeeping.

He stated that he and his wife would like to be the first to make a contribution to this worthy venture, and handed Dr. Bensusan the sum of Five Pounds. This was followed by a contribution of Five Pounds by Miss Alouise Boker —another Photographic Society of America visitor from New York, who was also present on this historic occasion.

The drive for new members of PSA took place and several applications were forwarded. A silver collection was then made for PSA Headquarters improvement fund and approximately 25 dollars was collected.

The following morning whilst Edna managed a spell of shopping, Bob proceeded to the Witwatersrand Native Labour Association to see K. G. Collender's Mass Radiography Unit. Here in the short course of a morning up to 3,400 African mine recruits are X-rayed daily on 70 mm. film—this is unique the world over.

Promptly at mid-day Bob and Edna together with Betty and Kin Bensusan were received by His Worship the Mayor and Mayoress of Johannesburg in their private civic apartments and friendly discussions took place.

A half hour was spent at the SA Broadcasting Corporation with an interview in which Bob told a nationwide audience of the ideals of PSA towards the great brotherhood of photography and international understanding.

A memorable and all too short stay came to an end as Bob and Edna left Johannesburg by air to attend the PSSA banquet in their honour in the City of Durban.

They were met at the airport by Lionel Bevis—PSA member and PSSA President and the following day addressed an audience of 400 in the lovely City of Durban. Some 13 new PSA members and two new Clubs were signed up.

Bob and Edna in Durban

By Lionel Bevis

Margaret and I went to the airport on Wednesday evening to meet Bob and Edna Goldman—they seemed tickled pink that we were both in evening dress and said it was the first time they had been so honoured. We took them down to the Edward Hotel and waited whilst they changed, then took them to the Marine Hotel where some 28 members of PSSA and their wives had gathered for the PSSA dinner. Despite the fact we were late in getting there everyone enjoyed themselves—the Marine served an excellent dinner. Bob gave a most interesting talk, and then put over an appeal for members for PSA. As a result 6 new members were enrolled.

Bob was highly delighted with the album sent down by Kin Bensusan. Margaret made the presentation. The Standing Committee presented a cigarette box with a painting of Zulu Women "Sweeping away trouble before a newly wed couple" and in it we enclosed a couple of lapel badges which they both wore for the remainder of their stay. Sandy made the presentation.

The following day Norman Partington took them out in the morning, and Sandy took them to lunch and for a drive in the afternoon.

The lecture in the evening was an outstanding success. 370 persons were present and everything went off like clockwork. We had a Prado 500 projector which Bob said was the same as he used at home, and a Phillips Recorder with extension speaker lent by Cash Wholesalers. It was certainly an eye-opener as regards presentation. John Geldard expressed thanks to Bob and Edna on behalf of those present, and PSSA.

Margaret and I went to the Airport on Friday morning to bid them Au Revoir and a happy trip home. My only regret is that they did not have longer with us.

Report on Goldman Meeting in Cape Town

By Lewis Lewis

The Goldman evening was a great success. In all, including Members of the CP Photographic Society and their friends, members of other Photographic Societies, and guests, there were over 300 present. The atmosphere was most cordial and the Goldmans had a reception of the warmth for which the Mother City is famous.

Bob's screening of slides was put over with professional aplomb and was greatly enjoyed by all present. He made an address appealing for more memberships in PSA and offered to stay on after the show to enrol new members. Precisely how many joined, I do not know but there were several.

The Goldmans arrived from Durban very shortly before the show commenced and whilst here, they were looked after by the senior members of the CTPS. On Saturday and Sunday they were taken around the Peninsula on photographic sprees. I believe they thoroughly enjoyed a Braaivleis laid on at the foot of Table Mountain.

There is no doubt that the charming personalities of our visitors made a profound impression on the local boys and strong friendships were struck up.

Robert J. Goldman, President of PSA, on his visit to Cape Town, South Africa, was guest of Cape Town Photographic Society. During the meeting Bob presented the plaque awarded by PSA for the best commercial film in the 1959 PSA International Cinema Competition to Lewis Lewis, FACL. The Goldmans presented their slide show to the more than 300 guests present and Mr. Lewis's prize winning film, The Artist and His Work, was also screened.

Landscape Impressions

Fun with color slide montage

*By Rita and Relfe Ehret**

Let's have fun with our photography. That's our motto, and it really pays off. We, like so many of you, are a husband and wife team, and we think that it adds to the fun to share our hobby, as well as our work in camera clubs, international salons, PSA work, programs, etc. On trips we both go running around the sand dunes, for instance, rather than one of us sitting in the car waiting impatiently for the other to "get it over with." Of course we have the problem of keeping out of each other's tripod holes, for each of us is strictly individualistic with his own pictures, and we always have a friendly rivalry going on between us.

One of the things that has added to our fun in photography has been the creating of our own impressions by means of montage or sandwich slides. Montage in French means "putting together," and that is what we do when we bind together two transparencies to make a finished picture.

Pictures, to quote a trite expression, are where you find them, but sometimes we find one half in one place and the other half in another. Putting them together may give you a picture or interpretation many times more interesting than either of the halves alone. In our opinion, the use of montage gives us one of the best ways of creating something different . . . of conveying our own ideas and feelings to others . . . on film.

*Mr. and Mrs. Ehret are both four star exhibitors in color. They are one of the ten husband and wife teams in the country. Both of the Ehrets began photography in black and white prints. They still submit prints to a few exhibitions and compete in club and council. Mrs. Ehrets is presently exhibition chairman of the Yolo International.

Figure 4. "Pacific Fantasy" by Relfe Ehret, in which the clouds were deliberately allowed to show through the rocks to give a feeling of unreality. A controversial slide with a fair record of acceptances.

There are many kinds of montage, all of which are used successfully in pictorial color work. Among them are:

1. Addition of colored gelatin filters, binding them with the slide to change the tonal value or enhance the mood.

2. Derivations . . . the binding together of the positive and negative, slightly off register, which has been used so successfully by many international exhibitors.

3. Putting together two ordinary slides to make an effect which may prove good. This has been advocated frequently and often it has surprising results, but good slides made by this method are often accidental.

4. The fourth way, and the method we use most and will discuss here, is by deliberately making halves of the picture we have in mind to put together to create the over-all effect. The result, then, is not accident, but the product of a definite plan, and so is the creation of one's own impression. It's fun to see how many ideas you can create.

Sometimes an unusual effect is achieved by binding a pattern slide with the main picture, the pattern tying together the picture elements, or aiding to create a mood. Again, we can help a scene by the addition of clouds to a bald sky, or the addition of sunset-colored clouds to change the mood. We also can put two related scenes together. In this case, we use a dominant shot, such as a silhouette in the sunset, and add a lighter background shot with interesting lines or texture (such as sand dunes). The whole thing should be kept simple, and the result can be quite striking.

For example, our landscape halves contain background shots, sand dunes, seascapes, and many other simple scenes with pleasing compositional lines. The dominant half should have a point of interest dark enough so that the background will not show through, and often is in silhouette. Your silhouette halves can be windmills, horses, barns, trees, etc. Here you can let your ingenuity work for you. One of our most successful series have been the silhouettes of saguaro cacti in the sunset—pretty but common record shots in themselves, but lending a dramatic impact when added to a background of dunes to give an "impression" of the desert.

Rita's "Southwest Impression" series is an example of this montaging which has proven successful with many international acceptances and honors. Figure 1

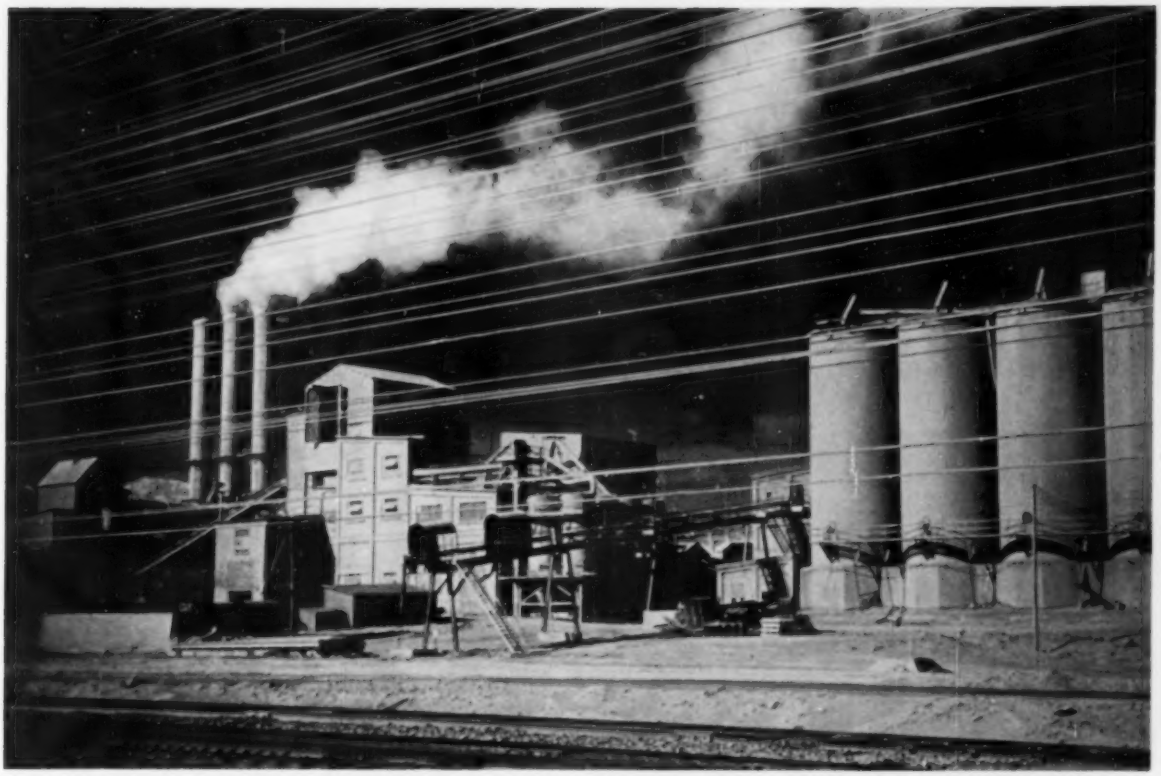


Figure 5. "Pattern of Industry" by Rita Ehret. Not an overlay, but we believe it owes its impact to the pattern effect of the wires.

is the dominant slide with saguaro silhouetted in the sunset. Figure 2 is the background slide of sand dunes with an interesting line. Put them together and you have Rita's Southwest Impression, Figure 3. The cactus silhouette accentuates a different background scene in each of the series . . . a dune, a mesa, or some other simplified scene, each with the overlay of the sunset tones from the dominant slide giving it extra impact.

While working on these attempts to create different scenes we have learned a few "do's" and "don'ts" (the hard way) which we can pass along to you.

1. Exposure: Keep your "halves" slightly overexposed, otherwise your finished shot will be too dark. We have found that about one stop over is right for us. You can bracket your exposures and experiment to find what suits you best.

2. Horizons: Keep them at a minimum. If you are taking cloud shots to fill in bald skies, take them near the horizon, but it is usually best not to include it. Horizon lines are apt to be so heavy that they might show through the other shot and make the montage too obvious. Don't let one horizon show through another. If you find that you have a "humdinger," but a double horizon does show, you sometimes can eliminate it by cropping up from the bottom and making a narrower panel shot.

3. Avoid the obvious montage in landscape or seascape shots. Don't have clouds floating around in the sea and sand. Your landscape montages must be carefully thought-out and put together so they are complete pictures in themselves. Obvious montages are unacceptable to many judges and critics, so do your best to prevent them from dismissing it with, "This is an obvious montage." However, we feel that sometimes an obvious montage is legitimate if you wish to produce an etherial effect. Figure 4, "Pacific Fantasy," by Relfe, is a controversial slide, but a cup-winner. Note how the clouds are visible in the rocks of the lower part of the picture. This was done deliberately to attempt a feeling of fantasy. Of course there are other types of obvious montage which have been quite successful. Portraits or flowers behind textured glass, sand ripples over crumbling ghost-town buildings, the femme fatale in the midst of a spider-web, are all examples of montage with which we are familiar, in both black and white and color. In this type of work you are limited only by your own imagination and creativeness. The variations are numberless, so strike out on your own and perhaps set a new trend.

Sometimes you can find your patterns, frames, and tie-ins in nature, or your local utility company may lend a hand. Wires are usually despoilers of otherwise beautiful scenes, but "if you can't lick 'em, join 'em," as Rita did in taking her "Pattern of Industry" series, (Fig. 5) several years ago. She stood under the cement-whitened wires and used a pola-screen filter to increase the contrast between the white wires and the blue sky. Without the wires it would be just a record shot of the cement factory, but with the wires to tie it together it becomes a picture.

4. Simplicity: This is perhaps the most important point of all. Just as simplicity is important in all photography, it is doubly important in making a montage shot, as two complicated halves would just double the confusion. Each half should have a minimum of strong, simple lines which, when put together, will give a harmonious scene.

So . . . the next time you go out for pictures don't forget the possibility of taking some shots especially for montage. We believe that nothing can surpass the single picture for communicating an idea or emotion to others, but planned montage will widen your photographic horizons and contribute to your enjoyment and your feeling of accomplishment in creating something new.

Figure 1. Dominant silhouette slide with sunset tones in the sky.

Figure 2. Background slide of sand dunes. While not noticable in reproduction, color slide has been slightly overexposed.

Figure 3. Combination of Figures 1 and 2 to create exhibition slide "Southwest Impression I" by Rita Ehret.

Pattern Is Where You Find It

By Samuel Grierson, APSA

Pattern does meet the eye every day and in any location. Not necessarily the especially created patterns but the simple ones that pop up almost of their own accord. The artist and the photographer can capture these on canvas or film but perhaps the photographer can do so with much greater ease as many of these designs are fleeting.

Most fleeting are those involving the human figure. The group of tourists gazing down upon the diners in Radio City's Sunken Plaza were in that interesting position for a mere matter of minutes. Quickly realizing the pattern and just as quickly snapping the picture recorded this design for all time. A twin lens camera was used for this.

Likewise the triangle motif made by the fireman and the young couple on the boardwalk had to be caught on the instant. The horizontal lines made by the boards in the walk, the triangle formed by the wall and the lagoon were there; the man with the camera merely realized the formation of the human triangle filled a necessary need to make the design an interesting one. This is not a posed picture.

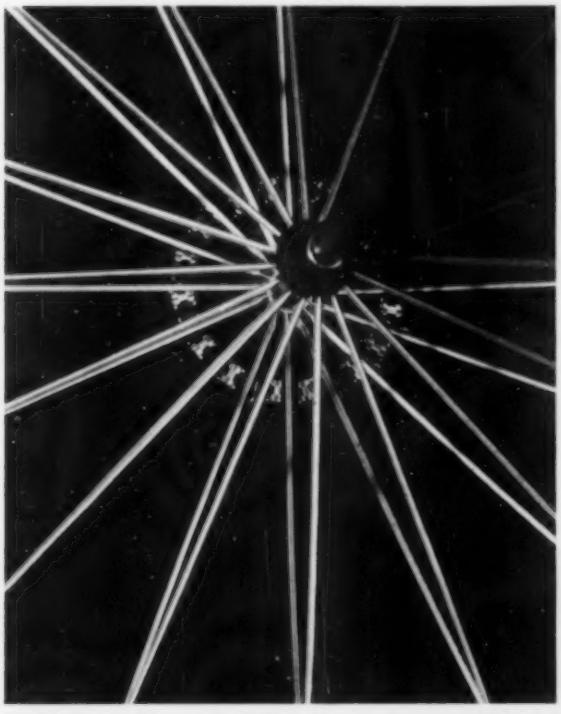
Boardwalk Pattern

Rear View

The stack of paper bound booklets is something that might be seen in any office. Placing the camera at the proper angle and throwing some light on the stack produced the picture shown here. As simple as all that, though it did take a little time in arranging and focusing. The unevenness of the line of metal staples was intentional to make the pattern lively. More animation was added by shooting at an angle.

An interesting pattern in radiation was made by simply opening a lady's umbrella, arranging the lights to get a suitable effect, and shooting down into the thing. Of course an umbrella with ribs of a color in contrast to the black silk cover was used.

Photos resulting from picturing what might be called construction of necessity can turn out to be exciting patterns. "Steel Against The Sky" for instance is the supporting framework of an ordinary city gas tank. In the photograph the subject is not portrayed for what it really is, but turns out to be a criss-cross division of space within the picture area.



Ribs

Steel Against the Sky

The same is true of the picture taken at the beachside game court. Here the markings on the cement, put there for the games, and the overhanging balcony with the pipe-like railing, combined to make an exciting and moving pattern.

To do this sort of thing with any hope of success the photographer must be observing in the first place and, just as important, must be discriminating in the selection of his view point. With those two qualifications the good camera man will find a world of material waiting to be pictured; much of it right in his own home area. Simple material for fascinating results.

Hold Your Finger Over The Lens

By Howard Oberlin

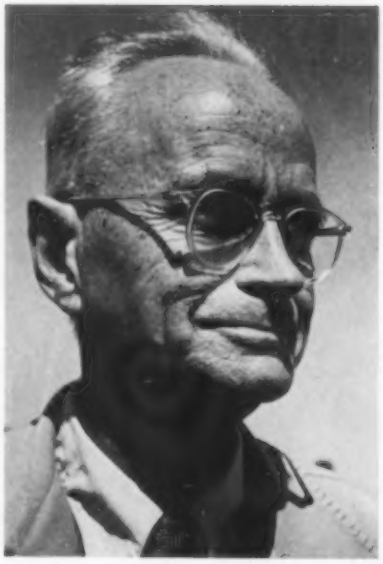
This winter sunset was photographed recently with the 1893 miniature "KOMBI" shown with the picture. This was probably the earliest miniature to use roll film and was produced by Alfred C. Kemper of Chicago. The camera was described with other miniatures in a recent issue of IMAGE, the George Eastman House Journal as follows:

"The KOMBI of 1893 was a metal box 2¼ by 1¾ inches which accepted specially spooled roll film. Each roll gave 25 negatives either 1¾ inch square or, if an accessory circular mask was fitted in the focal plane, 1⅝ inches in diameter. The KOMBI was a crude affair. The focal length of the single miniscus lens is 35.2 mm. A fixed diaphragm of 4mm. indicates an effective aperture of f/9; to stop down, the photographer slipped a lens cap with a pinhole in it over the lens barrel. A simple behind-the-lens shutter gave a choice of Instantaneous or Time exposures. The shutter was not self-capping and the instruction manual warns the user; DON'T FORGET TO COVER LENS WITH FINGER WHEN SETTING SHUTTER. The film was transported by turning a knob until three clicks were heard; there was no counter.

"On the back of the KOMBI there is a circular plate which could be removed by prying it loose like the lid of a can. When thus opened up the camera was transformed into a 'graphoscope' or viewer by inserting a positive film in the camera. To this combination of camera and graphoscope the KOMBI owes its name."

Automation, anyone?

Photographer of Fine Art



This is the story of an 80 year old photographer. His name is Theodore Seymour Hall and his home is in Los Angeles.

Mr. Hall's very first contact with photography dates all the way back to the 1880's when, as a child born of missionary parents in Hawaii, he watched with breathless excitement, how his mother used to produce pictures with what we now would consider "primitive" equipment she imported from the mainland.

"We children," recounts Ted Hall, "used to help mother when she went picture shooting and would squabble to see who could go into the darkroom to watch the picture come up." Yet with all that early photographic background, I did not become really interested in photography until I was almost 60. But this time I was bitten hard."

So hard, in fact, that at 80 Ted Hall, who had been honored a few years ago with an Associateship by PSA, was able to present a picture that a distinguished jury from outside the realm of photography has selected as an example of Photography in the Fine Arts.

The picture is his "Ebb and Flow" (see page 27 now hanging in the Metropolitan Museum of Art in New York City.

"My original objective in making this picture was to capture the very delicate and beautiful 'after effect' of the receding wave, or sea lace, as I call it, together with the approaching new wave."

That an amateur photographer of 80 is making pictures called "great" by noted experts on art surprised and delighted the members of the PSA Committee for PFA.

But there is yet more to be learned from Ted Hall's story.

"For three years after being bitten by the bug, I worked almost literally, day and night at photography, reading everything I could on the subject and trying all sorts of techniques," he said.

"And in all of that time I never once met one photographically minded person, I was so absorbed in the work. Beside reading books on art as well as on photography, I went to museums to study pictures.

"In 1948 I happened to see a small advertisement inviting anyone interested in photography to join PSA. Up to that time I had thought the Society was some sort of high hat institute with a carefully hand picked membership.

"I joined PSA and one of the pictorial portfolios of which my dear and valued friend, Dr. C. J. Marinus, APSA, was a commentator.

"And from then on my whole photographic world seemed to change because of the wonderful and priceless friends that I made. I have never been happier in my whole life."

Ted Hall says that he has been amused over the years by all the pother about whether photography can be an art or not. There is no doubt as to his own thoughts on this score.

He feels that because, on the one hand photography is more or less a mechanical medium, and because, on the other, there is so much of it being done, the best pictures by advanced workers have "to a large extent been buried."

That is, he has felt this way until PFA came along, "to unearth from the mass" as he puts it, "pictures that are beginning to be recognized by some of the highest authorities as fine art."

PSA Portfolio of Photography in the Fine Arts

By Joseph A. Bernstein, APSA

Chairman, PSA Committee for PFA

Photographs presented on these pages are now hanging in the Metropolitan Museum of Art in New York City. They are all the works of amateurs. Two are reproduced here from color slides; the others are black and white prints.

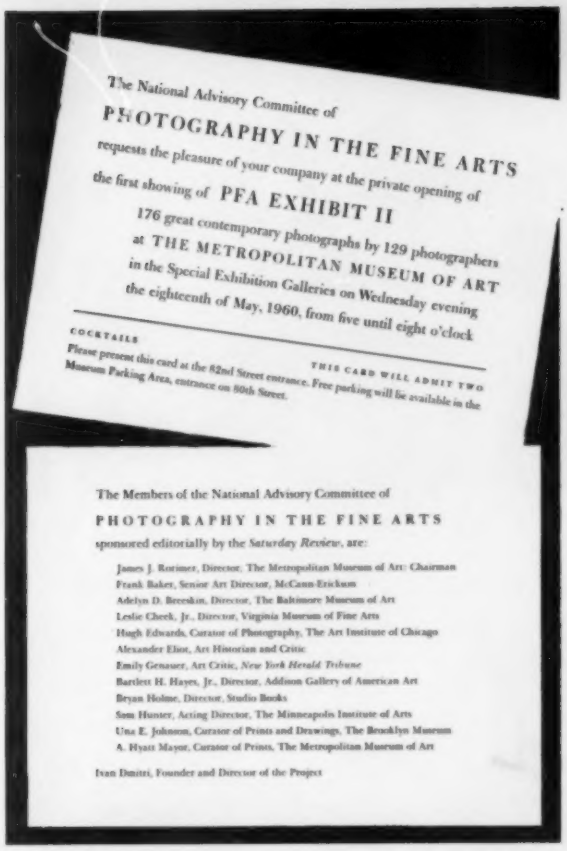
These are the pictures selected by a distinguished jury of art experts for inclusion in Photography in the Fine Arts Exhibit II.

They will be on display—along with others chosen by the National Advisory Committee of PFA—at the Metropolitan through September 3rd.

Duplicate sets of PFA Exhibit II pictures will later go on a tour of other museums of fine art in this country and abroad.

Mounting public interest in seeing good photography prompted officials of the Metropolitan to hang PFA Exhibit II in its large Special Exhibition Galleries instead of in the smaller Photo Gallery, as was done with PFA Exhibit I last year. These are the galleries used for the museum's most important exhibits.

PFA Exhibit II is more than twice as large as was the original exhibit with which Photography in the Fine Arts, founded by Ivan Dmitri, APSA, was first launched. And there are many more amateur pictures in PFA Exhibit II.



The National Advisory Committee of
PHOTOGRAPHY IN THE FINE ARTS
requests the pleasure of your company at the private opening of
the first showing of PFA EXHIBIT II
176 great contemporary photographs by 129 photographers
at THE METROPOLITAN MUSEUM OF ART
in the Special Exhibition Galleries on Wednesday evening
the eighteenth of May, 1960, from five until eight o'clock

COCKTAILS

THIS CARD WILL ADMIT TWO

Please present this card at the 82nd Street entrance. Free parking will be available in the Museum Parking Area, entrance on 80th Street.

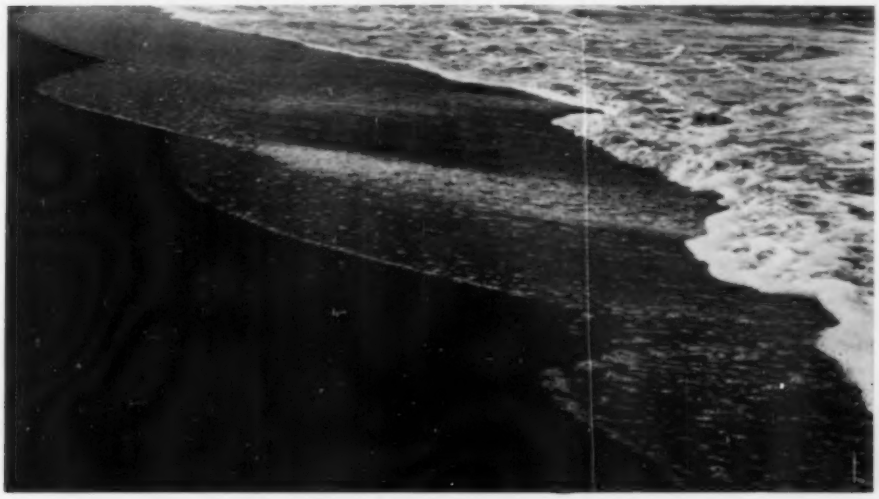
The Members of the National Advisory Committee of
PHOTOGRAPHY IN THE FINE ARTS
sponsored editorially by the *Saturday Review*, are:

James J. Rorimer, Director, The Metropolitan Museum of Art: Chairman
Frank Baker, Senior Art Director, McCann-Erickson
Adelyn D. Breeskin, Director, The Baltimore Museum of Art
Leslie Cheek, Jr., Director, Virginia Museum of Fine Arts
Hugh Edwards, Curator of Photography, The Art Institute of Chicago
Alexander Eliot, Art Historian and Critic
Emily Genauer, Art Critic, *New York Herald Tribune*
Bartlett H. Hayes, Jr., Director, Addison Gallery of American Art
Bryan Holme, Director, Studio Books
Sam Hunter, Acting Director, The Minneapolis Institute of Arts
Una E. Johnson, Curator of Prints and Drawings, The Brooklyn Museum
A. Hyatt Mayor, Curator of Prints, The Metropolitan Museum of Art

Ivan Dmitri, Founder and Director of the Project

This PSA Portfolio of Photography in the Fine Arts represents the culmination of the Society's experimentation in cooperating with the project on behalf of amateur photographers. The aim of the project, of which Mr. Dmitri is the director, is to win permanent recognition for good photographs as works of art.

(*Continued on page* 29)



Ebb and Flow
T. S. Hall, APSA

Homeward — Leo Lerch, APSA

Pattern in White — David M. Stanley, FPSA

Seated Woman on Stone Bench — Joseph Stanley

Workman Pausing — Carl Reinicke

Skating Rink,
Rockefeller Plaza, N. Y.
Mrs. Dorothy Meigs Eidlitz, FRPS, FPSA

Misty Morn — Jose Lorenzo Zakany, APSA

Dreamboat — Rev. W. George Thornton

Who are the makers of the pictures in this portfolio? All were members of PSA, or have become members since it was first announced that the Society would cooperate with PFA in searching out the best in amateur photography.

Several will be recognized as top-ranking salon exhibitors. Others are comparatively unknown except in their own immediate camera club circles. One is a veteran who celebrated his 80th birthday shortly before hearing of the distinction bestowed upon his entry.

Here are thumbnail sketches of them, arranged alphabetically:

Mrs. Dorothy Miegs Eidletz, FPSA, FRPS, of New York, whose distinguished career in photography embraces daring experiments in contemporary self expression with the camera, witness her successful picture of the "Skating Rink." She also has a long record of service to photography and to others through the Volunteer Service Photographers.

Theodore Seymour Hall, APSA, of Los Angeles, whose picture "Ebb and Flow" was selected shortly after his 80th birthday. But more about him elsewhere in this issue.

Leo Lerch, APSA, of Englewood Cliffs, N. J., who was first introduced to amateur photography by his wife, who was herself an amateur photographer when they married 15 years ago. He went on to a Salon record. She became his best critic. His picture "Homeward" was chosen for PFA Exhibit II.

Bruno C. Reinicke, of Manitowoc, Wisc., has a Salon record of 260 color slide and 60 black and white acceptances. For many years active in camera clubs and councils in his own area, he recently took up painting but continues his interest in photography as an art, lecturing on the subject. His PFA picture is "Workman Pausing." (*Continued on page* 31)

Cubes in Space — Dr. Henry Sarason

On The Arno — Susan Sherman, APSA

Winter In The Park — Jed Sylbert

A Passing Shot — Carl B. Wahlund

Dr. Henry Sarason, of New York City, is sometimes called the "restless pictorialist" (see his picture "Cubes in Space") because he is always searching for new ways to express himself through photography. He credits camera club disciplines for his basic skills. Among his many one man shows have been two requested by the New School for Social Research. Several of his pictures are in the permanent collection of the Museum of Modern Art in New York.

Susan Sherman, APSA, of Brooklyn, N. Y., has been a successful winner of prizes ever since she first took up photography to make pictures of her daughter. Of course she has "branched out" with many featured one man shows and hangings at Eastman House in Rochester. Several of her pictures made abroad, in addition to the currently honored "On the Arno," have won unusual recognition.

David Stanley, FPSA, of Paducah, Ky., whose wife also is an enthusiastic amateur, has been very active in PSA officially for many years. He also has been rated among the top ten of the world's exhibitors. He won the Popular Photography grand prize in black and white in 1951. And his picture, "Pattern in White," chosen for PFA, has been published as a cover for The PSA Journal.

Joseph Stanley, of White Plains, N. Y., is perhaps the youngest and the newest of the amateurs to have a picture ("Seated Woman on Stone Bench") selected by the PFA jury. Since becoming a serious amateur about two years ago, his work has created a "minor sensation" in his club and Metropolitan Camera Club Council circles.

Jed Sylbert, of New York City, is a trade association executive who took up amateur photography as a leisure time activity only six years ago, and has since made it "a way of life." Though he does not enter salons, his picture "Winter in the Park," made from his office window, was given a "Critics Award" by New York writers on photography.

Rev. W. George Thornton, minister of the Methodist Church of Titusville, Pa., received news of the selection of his color slide ("Dream Boat") almost 20 years to the day after he first purchased a roll of Kodachrome. He recalls that his work improved materially after joining a club in which "Bielenberg, Steck, Grant and others could show me the way." That was seven years ago.

Carl W. Wahlund, of Oakland, Cal., is one of the most active of amateur photographers in northern California, and Vice General Chairman of the 1962 PSA Convention which will be held in San Francisco. He writes that his picture, "A Passing Shot at Windows," was made on a camera club outing. He is a plant staff supervisor for the telephone company.

Jose Lorenzo Zakany, APSA, Mexico City, Mexico, made the color slide "Morning Mist." It has been accepted by 112 international Salons, has won many medals and other awards, and has been chosen for the permanent collection of the Color Division of PSA. He is currently on a tour of the United States, during which he will lecture before many camera clubs. He will be on the program of the 1960 PSA Convention in Houston as a featured speaker. "Having my picture chosen for PFA is the highlight of my 10 years as an amateur photographer," he said, "and is the greatest award that my picture has received."

Walter Lowitz, Chicago, Ill., is yet another member of PSA who made a picture selected for hanging at the Metropolitan in PFA Exhibit II. His successful picture is a colorslide, "Icy Sunset," nominated by the Saturday Review from among its annual contest winners. No print was available for inclusion in this issue of the Journal.

The recognition accorded these photographers by by experts in the world of art is, actually, two-fold. Readers of The Journal will recall that a Special Jury of seven art experts and three distinguished photographers screened amateur pictures submitted in answer to the first call for them, which was published in the January issue of The Journal.

These pictures were among 44 passed on to the National Jury for consideration along with the works of other photographers, mostly professionals, nominated by other sources.

PSA's participation in the PFA project grew out of an invitation from Mr. Dmitri for the Society to cooperate in searching for "hidden talent" among amateurs. He and the PFA National Advisory board were convinced, despite coolness on the part of many museums, that there was much good work among that produced by amateurs.

The Board of Directors, on recommendation of President Robert Goldman, unanimously approved acceptance of the invitation at the Louisville Convention this past October. President Goldman appointed a committee to work out a plan. When it became apparent that the ideal plan of cooperation could not be made operative in time for PFA Exhibit II, the committee, with the cooperation of Mr. Dmitri, went into action on a "trial flight" program which was announced in the January issue of The Journal.

Teaneck Camera Club of Teaneck, N. J., affiliated with the Metropolitan Camera Club Council, volunteered to handle all entries that were submitted for consideration in the trial flight. The Special Jury, chaired by Norris Harkness, Hon. PSA and a past president of PSA, was assembled.

Thus, within three months after the invitation was presented to PSA, amateurs all over the world were afforded an opportunity to have their work evaluated as art by experts.

This opportunity was not confined to members of the Society, or of camera clubs, but the final selections all proved to be the work of organized amateurs.

Thanks to the participation of those who were able to meet the deadline for this trial flight, amateur photography has achieved the highest recognition in that area of aesthetic appreciation outside the confines of its own circles.

The committee is now working toward improving its plan of cooperation in preparation for PFA Exhibit III. All interested are advised to start thinking now about pictures they will want to submit for evaluation as fine art when the new deadline is announced.

Headquarters Drive Pushes Towards Finish Line

$45,000 Collected—$10,000 To Go

Have You Given? Has Your Club Given?

By Irving A. J. Lawres

Chairman, Headquarters Improvement Fund Campaign

The Headquarters Improvement Fund Campaign to rehabilitate Headquarters in Philadelphia rolls on towards the established goal of $55,000. Thanks to the generosity of individual PSA members, of PSA affiliated Clubs, and of industrial concerns, about $45,000 has been collected. That means only $10,000 more to go.

The last $10,000, however, is always the hardest. But we are sure of success because there are many PSAers who still have not sent in their contributions—and many large clubs have not acted. We have no doubt that they intend to do so.

Still Needed

This is the picture of what is still needed, breaking down the required $10,000 to members alone.

No. of Gifts	Size of Gift	Total
1	$500	$500
2	250	500
5	100	500
10	50	500
200	20	4,000
400	10	4,000
618		$10,000

That does not look like a difficult objective considering the number of members still to be heard from. Moreover, a certain additional amount is sure to come from clubs. Getting out reminders, however, is expensive and time consuming. The less we spend on postage and other mailing costs the more money there will be for Headquarters.

Additional Gifts

One generous member recently sent us an *additional* gift—$600—making his total contribution $1,100! You'd recognize his name; an active PSA worker. Other additional gifts of $5, $10, $20, and $100 have been received and they are most welcome. If on reviewing the progress of the compaign, the certainty of success, the important objective—a Headquarters that properly reflects the character, dignity, and importance of the Society—if you feel that you would like to have a little larger part in insuring the success of this endeavor—then act accordingly.

We are on the home stretch and we don't want to slow down. The important thing is for the members and clubs to *act*—to get the checks in so that we can bring this important project to a successful conclusion.

Photography and PSA have done a great deal for each and every one of us. Here is our opportunity to repay some of our debt to the greatest hobby in the world.

Remember what photography has done for you and then be half as generous. But, please, won't you send your check today to Headquarters Improvement Fund, 2005 Walnut Street, Philadelphia 3, Pa.

P S & T Supplement

TECHNIQUES DIVISION SUPPLEMENT For ALL DIVISIONS

Editor: Ira B. Current, FPSA, 26 Woodland Road, Binghamton, N. Y.

The Rest of The Team

Expression in photography is a cooperative effort. In Hollywood where motion pictures are made, the teamwork is very close, and the various members of the team can appraise from time to time the efforts of the whole group. The amateur teamwork is not quite as well defined, but it is there. Let's take color photography as an example.

We can start with the hundereds of people who got together to design, manufacture, and control the quality of the multi-layer film that we load in our cameras. The success of their effort plays a big part in the character of the final picture. (Our story would still be good even if we didn't mention all those who had a part in the important job of getting the film into our hands.)

Then, we the photographers have the chance to do our part in selecting, composing, lighting and exposing the pictures. We amateurs know a great deal about the work of this section of the team. Finally, then, there is the third group participating in our pictorial effort: those who got together their various skills to process the pictures for us. We could have selected from any area: Black-and-White photography, Movies, or Stereo for our example.

We had the honor of being in the company of a part of team number one the other day when we toured the new Graphic Arts Laboratory at duPont in Parlin, New Jersey. This was built and staffed at considerable expense to conduct research and development work in graphic arts products and processes, to service various products, to train duPont sales and technical representatives, and to provide training and help to their customers in the Graphic Arts field.

Featuring a line-up of the very latest in professional Graphic Arts cameras and equipment, the new laboratory will serve photographers more than would be apparent from the surface. For it is in the area of "Graphic Arts" that our work as photographic artists come to the attention of fellow photographers and to those who are appreciative of the works of today's lensmen. (We should also mention that some of this duPont effort will probably rub off to even bettering their Black-and-White sheet films and movie films that serve amateurs as well as professionals.)

But most important of all, it represents the interest of those in industry who have the foresight to direct money and effort into improvement of the art and science of photography. While there may be the selfish motive of profit from increased use of photographic materials, the efforts of science and industry are enormous compared to those contributed by the final user; the photographic artist.

Lou Gibson deserves the applause of all members of the Society for the excellent techniques article on the subject of "Magnification and Depth of Detail in Photomacrography" appearing in this month's PS & T Supplement. We first heard of this from Lou while he, Don and Ruth Bennett, and others were together at the same table at the Annual Banquet of the Society in Louisville last year. This article, in our opinion, is the model of what PS & T articles should be like—not as thorough and well organized as this one, to be sure, for we aren't all Lou Gibsons, but full of real know-how on a technique for those who love to do things with photography.

IRA B. CURRENT, FPSA

Technician in new Du Pont graphic arts laboratory at Parlin, N. J., checks quality of halftone dots on large size sheet of "Cronar" litho film. Critical examination of all steps in the photographic process is part of the assignment of the newly opened laboratory's personnel. Their objective is to assist customers in improving the quality and reducing the cost of their work.

Magnification and Depth of Detail in Photomacrography

H. Lou Gibson, FPSA

Medical Division, Eastman Kodak Company

In the field of photomacrography, where prints of small subjects are made at over-all magnifications varying from 1 to about 30, a compromise constantly has to be made between magnification, definition and depth of field. These factors have been discussed and their effects illustrated in previous parts of this investigation.[1,2] Such compromises can be made judiciously after considerable experience. Yet one is never sure that the best adjustments have been made in camera aperture, negative magnification and enlargement for the numerous combinations possible with varied subjects. Therefore, formulas or curves that indicate practical values to employ would be quite useful for arriving at the best compromise.

The image-producing capabilities of camera lens, negative, enlarger lens and paper limit the resultant detail separation—the distinguishability, in the print, of small elements from the subject. Hence, there is a final print scale beyond which further magnification becomes "empty." Also, there is a certain aspect of depth-of-field considerations that is affected by these capabilities in photomacrography, although it is of no practical importance in ordinary photography.

For two-dimensional subjects it would be useful to have curves that show how to select relative apertures and negative magnifications attainable with the camera lenses at hand to secure optimum print magnification. This is particularly true when photographing flat surfaces for which depth of field is a problem only so far as the facility for accurate alignment and focusing is concerned. The degradation introduced by the enlarger ought to be known too, when the photography of such flat subjects is to entail enlargement. It would then be possible to judge whether a setup involving only contact printing should be worth considering. Or, the proportion of camera to enlarger magnification is a worthwhile ratio. An approximation of the corresponding resolution of, or degree of separation between, detail elements in the focused subject plane would also be a valuable figure in all cases.

For three-dimensional subjects an expression that would indicate depth of field on the basis of the required definition at the near and far limits would be extremely useful. It would provide more realistic depth figures than existing formulas offer photomacrographers. It would also ensure that the desired detail separation be present throughout the field when such a goal can be achieved, and indicate when it cannot.

In all these considerations it is the size of the smallest details that are to be separated which should be kept uppermost in the mind. For example, in Figure 1, the spots on the flower are relatively large in comparison with the dots on the wing of the moth—both have been photographed to the same scale. In both subjects, the *desired* detail has been recorded. However, there are smaller detail elements on the flower, such as fine hairs and pores, that could have been depicted had the definition, or degree of "sharpness" as it is often rather loosely called, been the same as that achieved for the moth. What is the reason for having to sacrifice such detail in the flower?

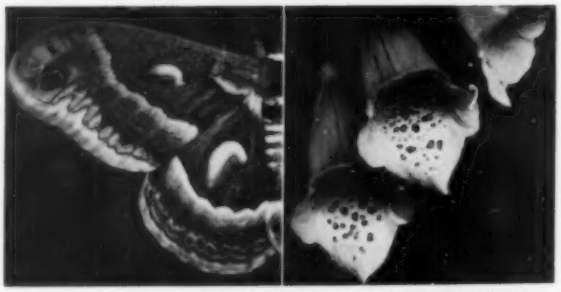


Figure 1—Cecropia moth and foxglove photographed and reproduced to the same scale. The size limit of the desired detail is represented by the dark spots on the flower and the peppery dots on the wing. Detail as small as the latter has not been recorded on the flower, even though it exists. Yet both photographs appear to have satisfactory definition. It is thus apparent that acceptable quality depends on the nature of the specimen. This paper deals with the establishment of optimum technical conditions for depicting various photomacrographic subjects.

The foxglove presents a depth problem that does not pertain to the moth. And it is physically impossible to obtain both great depth and definition. Therefore, technical conditions were selected for photographing the flower that would separate the spots and also provide acceptable overall or "general" definition throughout the depth in the field—there was no need to separate the finer elements. The major concern of the photomacrographer is the selection of such optimum technical conditions.

The approach to the above problem will be toward evaluating the effects of unavoidable physical imperfections in the image on the print. These involve limitations in optical and photographic components and tend to blur the photograph. They are aberration and diffraction patterns, which combine to prevent the lens from imaging a point as a point, and graininess and turbidity in the emulsion, which prevent the film from recording a point as a point. These blurs can be calculated or measured separately. A method for approximating their effect in combination will be worked out in the analytical section of this paper.

Table 1 lists the blurs involved. Since no single one of them is very large, it is their sum with which we are concerned. Nevertheless, every effort to keep each blur small is worthwhile. This, of course, is well known for the avoidable manipulative imperfections also indicated on Table 1.

TABLE I (5A)

Factors that degrade the crisp rendition of photomacrographic detail

	Location of Blurs				
	Subject	Camera Lens	Negative	Enlarger Lens	Print
PHYSCIAL BLURS:			Camera lens, diffraction pattern (Airy disc)		Enlarger lens, Airy disc
			Camera lens,		Enlarger lens, aberrations
			geometric aberrations		Emulsion factors
			Emulsion factors		Depth circle of confusion
MANIPULATIVE BLURS:	Subject motion	Illumination flare	Poor focus	Dust and dirt	Poor focus
			Camera motion		Enlarger vibration
	Diffuse illumination	Dirt			Safelight fog
					Curtailed development

The physical blurs—called circles of definition herein—cannot be eliminated but their sizes can be juggled for best results. This paper develops considerations for doing this.

The manipulative blurs can be controlled by means of careful parallax focusing; clean equipment; firm and anti-vibration supports; fast electronic-flash exposures for living specimens; time exposures made with the light switch rather than the camera shutter; "raw," collimated, or point-source, lighting; and correct positioning of the subject. Handling these measures effectively depends on the technical skill of the photographer. Suggestions have been given elsewhere.[2,3,4]

The first application of analyzing the consequences arising out of the physical blurs in photomacrography is that of obtaining working curves for two-dimensional subjects. These are shown in Figure 2 and enable the photomacrographer to select technical conditions for obtaining optimum detail. To give the curves further meaning, Figure 3 relates the data to actual examples and includes a demonstration of the effects of lighting. These illustrations will be discussed in the following text. Then, as the second application, Figures 4 and 5 will be presented in a subsequent section. They indicate how to additionally take depth factors into account when photographing three-dimensional objects.

Reading Useful Magnification Curves

Before going on to the significance of these curves, the materials and equipment employed in their production must be specified. The data are based on the use of a low-graininess film like Kodak Panatomic-X; a high-definition lens, like the f/4.5, 2-inch Kodak Enlarging Ektar Lens; and enlarging at an effective* aperture of fe/50 (whenever possible) with the same lens in the Kodak Precision Enlarger. The photomacrographer will be able to work out similar data from the discussion in the analytic section to suit conditions that vary appreciably from these. The prints were made on a glossy paper and the conditions apply to a viewing distance of 12 inches. The desired print-detail separation has been set at 6 elements (lines)/millimeter.

*Effective aperture is $E+1$ times relative aperture, and is the ratio of the lens-paper distance to the diameter of the exit pupil. E is the enlarger magnification.

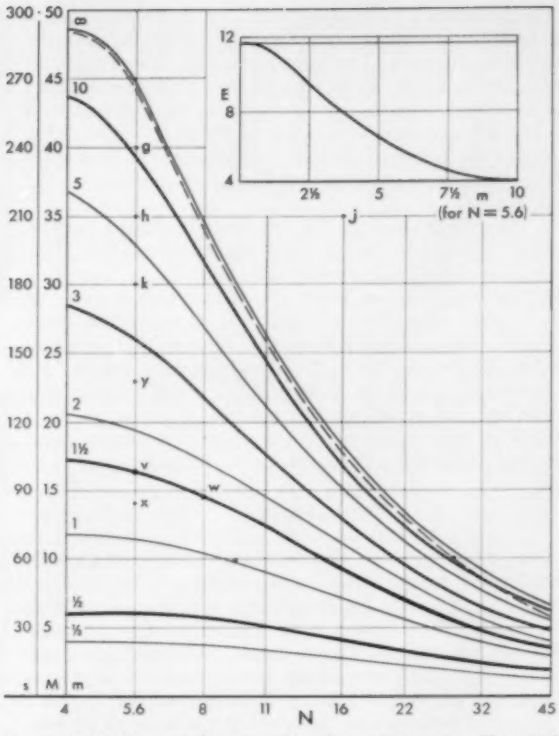


Figure 2—Useful magnification and enlargement curves. Key: "s" is detail separation in elements/millimeter. "M" is over-all magnification; "m" is camera magnification. "E" is degree of enlargement from the negative. "N" is marked camera aperture. The small letters mark specific technical conditions that were adopted for making the negatives for Figure 3. The broken line indicates the results from good contact printing.

The method of utilizing the curves for finding optimum magnification is outlined in the text.

Figure 2 gives the desired detail separation, s, as the quantity known by the photographer, and the f-number of the camera, N, as the independent technical variable. It then shows how to record the desired detail by selecting a suitable final print scale, M, and the camera magnifications, m, that must be adopted at the available relative apertures, N.

While s is given rather specifically in elements/millimeter, it should be realized that the actual resolution is dependent upon the nature of the surface texture of the subject. Ordinary resolving-power values are based on bar charts and the like, but photomacrographic detail does not always resemble such patterns. Hence the concept of detail separation, even though of practical use, approximates rather than corresponds to the concept of resolution. The separation values are rated in the same way as resolution figures would be when the latter are based on a column and a space constituting one "line" in a bar chart. To give a numerical example: an entity 0.1 millimeter wide plus an adjacent equal space constitutes an element 0.2 millimeter wide, representing a detail separation of 5 elements/millimeter. Detail separation is discussed further in the analytic section.

The positions of the small letters on Figure 2 indicate the technical conditions employed to make the test exposures for Figure 3. The inset curve gives information on useful enlargement, E. It was plotted from the enlargements called for at the intersections of the m curves with the $N=5.6$ co-ordinate in order to attain the permissible values of M indicated by these intersections. The way to utilize this curve is contained in the suggestions of the next section.

The significance of the curves in Figure 2 can be gained by studying one of them–say the $m=5$ line. This shows the conditions arising out of utilizing a camera magnification of $\times$ 5. When the photograph is made at f/4, a detail separation of about 220 elements/millimeter is obtainable–provided a final print scale of 37 is adopted. This would necessitate a $\times$ 7.4 enlargement (M/m E) to be made in order to attain $M=37$. It will be seen that by picking off other points from the $m=5$ curve, new conditions arise which are governed by the camera aperture that might have to be employed. Examples are:

m	N	s	M	E
5	5.6	198	33	6.6
5	16	90	15	3

The logical question that now arises concerns the significance of points outside the curves. If we take an $m=5$ - $N=5.6$ negative and enlarge it to $M=40$, will we have $s=240$? The answer is no. The effect of empty magnification has crept in. That is to say, a detailed separation of about 200 (198) has merely been enlarged to a greater extent. But no new detail has been opened up.

As stated before, and explained in the analytic section, the curves are based on a detail separation of 6 elements (or lines)/millimeter in the final print. Thus, an $\times 33$ over-all magnification of $s=198$ results in a print separation of 6. The $m=5$ - $N=5.6$ negative records only a detail separation of about 200 and, of course, this appears as 40 on the negative and is enlarged to 6 elements/millimeter through the agency of $E=6.6$.

When this negative is enlarged further to $M=40$ ($E=8$) this same detail now appears at 5 elements/millimeter on the print–but $s=240$ detail has not been concomitantly enlarged to 6 elements/millimeter. Such detail has not been separated at the negative in the first place, because that would have required the impossible resolving ability of lens and film of 48 elements/millimeter.

The curves show that to record $s=240$ at $N=5.6$, m must be about 10 and M should be 40. This calls for a resolving capability at the negative of 24 in contrast to 40 required at $m=5$. This is not a contradiction because it is the camera lens as well as the emulsion that governs the detail separation at the negative–the effective aperture of the lens governs the size of the Airy disc blur component. The equations for deriving the curves take this into account.

To examine the significance of selecting factors below a given curve, we can first consider the empty magnification discussed above. That is, trying to achieve the $s=240$ of the $m=10$ curve with an $m=5$ negative instead of $m=10$ was unsuccessful. The other circumstance would be that of making a negative at say, $N=5.6$ - $m=10$, but only enlarging it to $M=33$. The lens-film system would record 24 elements/millimeter as before; an enlargement of 3.3 would result in a print that bore the separable detail at about 7.3 elements/millimeter. This could be observed but the print would be more difficult to study and would not attain the capabilities of the system. Furthermore, should M be reduced still more–e.g., to 10 by contact printing, yielding a print separation of 24–the detail of interest would have to be observed with a loupe. In extreme "under magnification" the resolving capabilities of the paper may not be sufficient to record the desired detail.

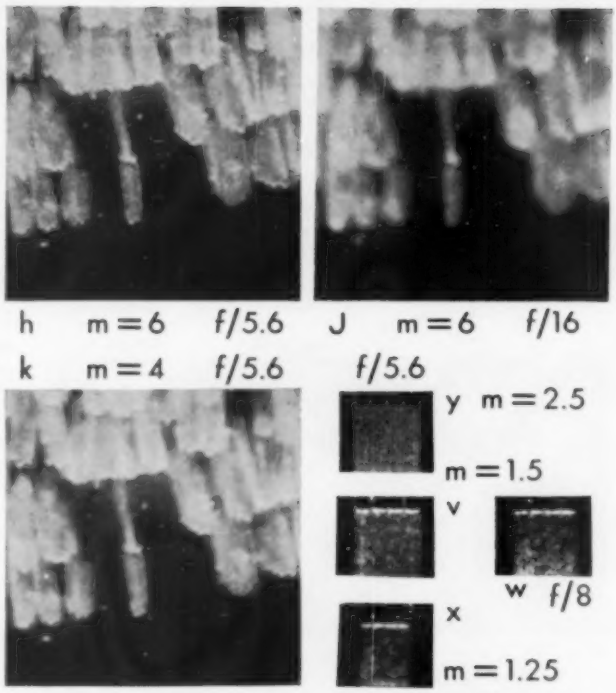


Figure 3—Test photographs made under conditions indicated by Figure 2, except that, to offset losses from reproduction, they appear here at 2½ additional magnification over the magnification that would be useful for prints from negatives "h" or "v." Wing scales, low-contrast subject; reading from left to right, subject was photographed at conditions "h," "j" and "k" on Figure 2—h: curve calls for a separation of 210 elements/millimeter; finest teeth on actual black scales measure an average of 200 elements/millimeter under the microscope; they are adequately separated here, indicating a recorded s of just over 200—j: made outside the useful limit indicated by the curves; definition is entirely inadequate.—k: curve limits separation to 180 elements/millimeter; teeth on actual white scales measure 93 elements/millimeter; these are well separated but the finer black teeth begin to merge; the photograph was not made at a high enough negative magnification to meet the criterion represented by "h"; yet the print is enlarged more than is necessary to record the white teeth. The wing scales for "g" were lit at a contrasty ratio with a spotlight for comparison with "h", which was illuminated with a floodlight to reduce contrast for checking the curves.

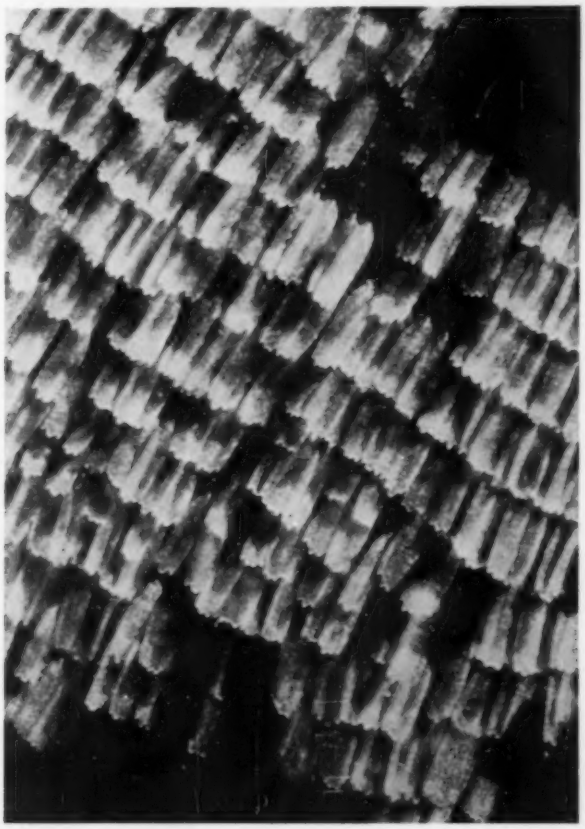
Resolution pattern; micrometer slide ruled with 100 lines/millimeter; photographed at conditions "v," "w," "x," "y".—v: the lines are just defined.—w and x: made a little outside the conditions for s = 100; lines are not defined. (Note it was not possible for the author to enlarge print "x" up to quite the same scale as "v", "w", "y" for reproduction; but smaller prints for conclusive checking at 12 inches were made to equal final scales.)—y: since curves represent threshold conditions, it may be necessary to employ a safety factor when a given detail is to be boldly shown; to do this, here, technical conditions for 1/3 higher separation than that yielded by the "v" conditions were selected.

When considering lower print scales on Figure 2, several sets of conditions are apparent. Thus for $M=10$, combination from $m=1$ and f/8 to $m=3$ and f/22, are indicated. However, smaller values of N will lead to greater definition than that on which the curves were based. For example, s is 30 at: $M=5$, f/22, $m=1$ and $E=5$, and this is the best that can be obtained at f/22; yet s would equal

65 at f/5.6 with the other factors remaining the same.

(Note: This figure can be obtained by utilizing these factors and finding for the diameter of the final print blur, l, a value of 0.153 millimeter in Equation (2) of the analytic section. It should be observed that this expedient could not be employed for determining suitable higher magnifications. When $l=0.153$, M max for $m \longrightarrow \infty$ is only 17.8 at f/5.6; the separation is then 230, with 13 elements/millimeter on the print. The separation of 65 at $M=5$ at f/5.6 given above would also be printed at 13 elements/millimeter under the conditions above. This is more stringent than necessary and the finest detail could not be seen with the unaided eye.)

The broken curve represents conditions for contact printing; here $m=M$. It lies above the corresponding points for enlarging. The dot marks the $\times$ 10 scale, for example, and is above rather than at the intersection of the $m=10$ curve at the $M=10$ ordinate. The reason for the better definition, of course, is that enlarging losses for $E=1$ are not involved and that those from an excellent contact printer are not as great. Nevertheless, when E becomes fractional the negative blurs are recorded as a reduction and this could more than offset enlarger losses.



g

Hence, with a good enlarger, reduction could lead to better definition than contact printing. This is why the contact-printing curve lies below the upper limit of the solid curves, which represent a system that includes an enlarger. Since the differences are so slight and since it is practically very difficult to focus an enlarger sharply for a reduction, or even at 1:1, the gains from reducing over contact printing are chiefly of academic interest.

Figure 3 was prepared to show how to find the useful magnification in practice and to indicate how well the experimental and predicted results agree. Wing scales of a morpho butterfly were photographed under conditions "h," "j" and "k" from Figure 2. The prints were all enlarged to the magnification indicated by "h"–$M=35$–for visual study. (For the illustration here other prints were made at $M=35 \times 3\frac{1}{4}$, and this is explained in the section dealing with prints for journal reproduction.) At $M=35$ the enlargement from a negative made at a camera magnification of $m=6$ should separate 210 elements/millimeter. From a measurement under a microscope the finest teeth on the black scales averaged 200/millimeter. These are separated under conditions "h." However, an $m=6$ negative made at $N=16$, instead of $N=5.6$, does not provide a print that separates these teeth, because the size of the Airy disc of the camera lens is too great. Similarly, an $m=4$ - $N=5.6$ negative when over-enlarged to $M=35$ does not separate the black teeth adequately, because the lens-film combination has not resolved them. This is to be expected because condition "k" should only yield 180 elements/millimeter. It can be seen that the "k" print does separate the white teeth to a wide degree. These measure 93/millimeter and are over-enlarged for "k" conditions; yet these factors produce empty magnification, for the black teeth have not been separated as they have been on the "h" print.

The micrometer slide was photographed under conditions "v," "w," "x" and "y." It carried 100 lines/millimeter. The curves predict that they should be just separated on an $m=1\frac{1}{3}$, $N=5.6$, $M=17$ print; they are. Conditions "w" and "x" are analogous to positions "j" and "k." Similar results obtain.

Inasmuch as the curves represent a threshold separation (because they plot the lower boundaries of useful magnification), the "v" print has only just resolved 100 lines/millimeter. Whenever a photograph is intended for boldly recording desired detail elements rather than to present acceptable general definition, conditions should be selected that incorporate a safety factor. This can be done by adopting technical conditions that would just separate elements finer than the desired detail. For example, conditions "y" would just record 130 lines/millimeter; but they delineate 100 lines with good emphasis. This represents an increase in s of about 1/3.

A check was made with a slide having 200 lines/millimeter around the $m=5$ - $N=5.6$ point; the results were similar. The slides were back- and cross-lit to simulate crisp photomacrographic detail, but not the high contrast of the usual resolution chart. The results show how well the curves agree with practice. It should be noted that for the "v" conditions the theoretical resolution of the camera lens alone is 330 and of the film about 80; the negative image represented 66 lines/millimeter and these are just defined, as the curve predicts.

To demonstrate that the selection of the optimum camera and enlarger conditions alone do not guarantee best results, print "g" was made to the same final scale. Part of the improvement in sharpness over that of the "h" print is due to a higher camera magnification (used here because this particular comparison was unforeseen at the time of making the negatives), but most of it can be credited to the increase in lighting contrast. Print "h" was made with a floodlight for critically checking the curves with a low-contrast subject, whereas print "g" was made with a spotlight. The reproductions show how important it is to provide suitable illumination for a crisp rendition of photomacrographic subjects.

Utilizing Useful Magnification Curves

It will first be noticed that at the higher camera magnifications m, the final print magnification, M and the detail separation, s, start to drop appreciably at about a relative camera aperture N of f/5.6. As the opening is made larger there is some gain, of course, and certainly f/4 is a valuable aperture for use with good photomacrographic lenses. However, most lenses are subject to losses from aberration when they are opened up beyond f/5.6. Such losses would depress the curves. Errors in focusing are more likely when the lens is only stopped down to f/4 rather than f/5.6. Hence the first suggestion:

(1) Utilize f/5.6 unless it is known that the lens and photographer perform well when a wider opening is adopted.

Each curve shows the camera technique conditions that will just separate the desired detail. The second suggestion is:

(2) Select the detail separation required and final print scale needed; then find a relative aperture for the camera lens and a negative scale that will yield the results.

It should not be overlooked that the curves represent threshold conditions, because the definition indicated by any point on one of them will be just apparent. The reason for this is that the curves represent the lower boundary of the resolving ability of the system producing the photographs. A safety factor, based on individual experience, can be applied for the bold delineation of specific detail rather than for a given degree of general sharpness if desired. The effects of using such a safety factor are shown in Figure 3.

(3) A suggested safety factor for obtaining an emphasized detail separation is the selection of a value for s that is 1/3 greater than the actual separation of the desired detail elements, see Figure 3. The technical conditions for this increased value should be utilized instead of the ones that would ordinarily be adopted.

The topmost curve is the academic limit of the capabilities of the system. It shows what could be obtained with an infinitely high camera magnification.

(4) Should the required separation be greater than that for the topmost curve, a *photomicrographic* technic will have to be adopted. In practice there is little to be gained beyond a photomacrographic camera magnification of 50.

As m is increased, s increases, with other factors remaining constant. The $m \longrightarrow \infty$ curve shows the limit of useful magnification with an enlarger; the contact-printing curve is almost coincident with it.

(5) For any two-dimensional subject m should be made as large as possible. From a practical standpoint, good contact printing is sharper than enlarging when m can equal M.

So far we have been dealing with relatively high print magnifications. Upon examining the lower range of the curves, it will be noticed that the choice of lens aperture is not so critical.

(6) For print scales of about $\times$ 5 or under, and for 1:1 negative scale, the camera lens can be stopped down to about f/22 to minimize aberrations when the lens is not as good as the one employed for these experiments and to offset focusing errors. However, it should not be overlooked that better definition will result when wider apertures and good lenses are adopted.

The inset curve on Figure 2 shows the useful enlargement, E, as a function of negative scale and for a camera aperture of f/5.6. It is thereby indicated that an enlargement of $\times$ 12 marks a point where losses in definition caused by the enlarger become quite influential. The curves are based on an effective enlarging aperture of fe/50 and the Airy disc at this opening. The usefulness of enlarging at about $E=9$ and beyond is less than the curves indicate. The reason is that effective apertures greater than fe/50 will result at the higher enlargement with the f/5.6 enlarger lens. Also, the curve indicates that the efficiency of enlarging starts to fall off rapidly beyond $E=10$.

(7) Enlargements of 8 times or less should be planned for a photomacrograph to be viewed at 12 inches.

It should be understood clearly that Figure 2 represents average conditions and that photographs made below the curve limits may often be acceptable. The important determining factor is the order of the detail that is required. This has been discussed in connection with Figure 1 and more extensively elsewhere.[2] The author has seen 14 x 17-inch exhibition prints upon which the finest distinguishable elements were separated by almost a millimeter, yet they were adequate for their purpose. When an individual application indicates that fine detail is not needed, a set of curves can be calculated with a larger value for the print definition circle than used for Figure 2.

Prints for Journal Reproduction

It is generally accepted that for a very good photomechanical reproduction (120-line screen or finer) in a journal, the reproduced image size should be 2½ times that of the corresponding glossy print intended for visual study at 12 inches, if about the same detail is to appear. The engraver can also produce sharper plates when at least a slight reduction of the copy is permissible.

Suppose a subject is to be reproduced that has detail of interest requiring a separation of 90 elements/millimeter. Figure 2 shows that M should be 15. This can be achieved through any means discussed previously. Then the area of interest should be cropped to the minimum and a reproduced size of 2½ times the visual print planned. Also, it is best to submit a print to the engraver that is at least 1¼ times as large as the *reproduction*. Both extra enlarging factors, of course, produce empty magnification in the submitted copy but ensure that most of the required detail appears in the journal. The procedures also guard against wastefully making the illustration too large. Another sample set of factors would be:

s	=	150
M	=	25
m	=	3 (at f/5.6)
E	=	8 1/3
E extra	=	3⅛ (2½ × 1¼)
E total	=	26

The prints to be submitted should be viewed at 3⅛ feet and the detail observable should persist in the illustration when reproduced at 62½ times ($2\frac{1}{2} \times M = 25$) the subject scale. These procedures were followed exactly for Figure 3.

(8) Copy sent to a printer should be 3⅛ times as large as the corresponding prints for visual study at 12 inches. The submitted illustration should be linearly reduced in the journal to 4/5 of its size.

Depth of Detail

A distinction is made in this paper between depth of field and depth of detail in three-dimensional subjects. The former can connote a wide range having poor but

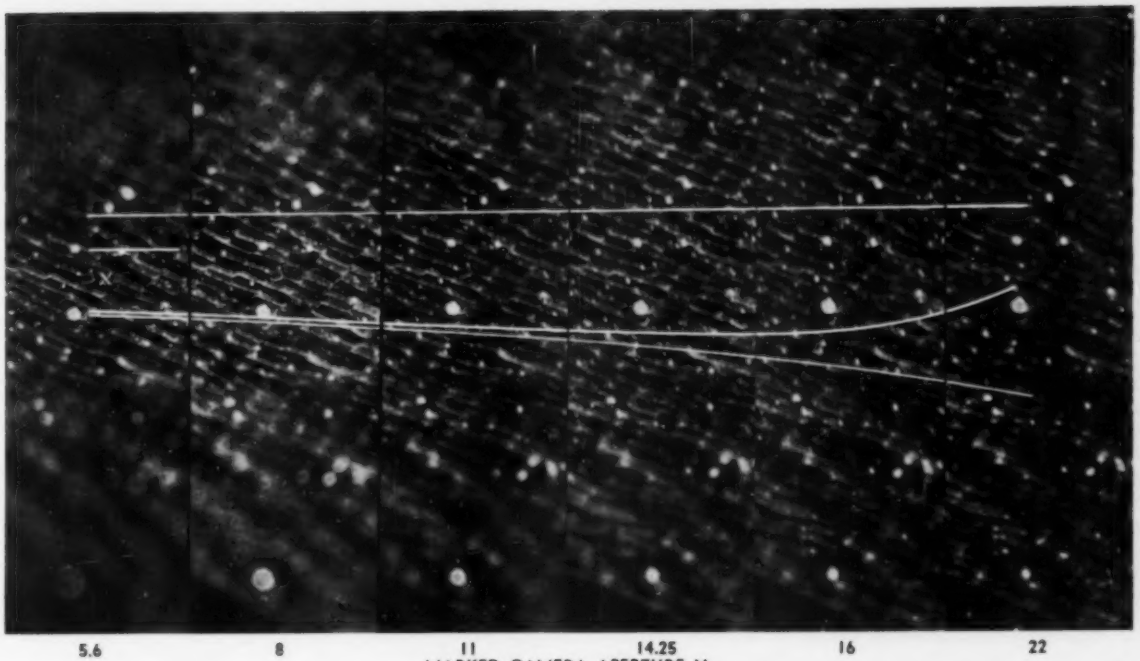


Figure 4—A photographic demonstration of depth of detail made at m = 4, M = 12. The upper curved line marks one of the limits; the lower, a limit from ordinary depth-of-field formulas. The straight lines mark the other depth-of-detail limits for f/14.25 and f/5.6, respectively. The single wing scale that is turned broadside-on in the plane of sharpest focus, "x," (instead of at 45° like the others) has "teeth" that reproduce at 6 elements/millimeter on a print intended for viewing at 12 inches. At f/22 these are not separated and this is the condition for no depth of detail nor useful magnification adopted in this investigation. Here, f/14.25 yields the optimum depth—0.57 millimeter.

homogeneous definition. The latter, on the other hand, is intended to define a region whose *limits still render the useful detail separation desired.* As will be seen from an actual example in Figure 4 and from the derivation of Figure 5 later, depth of detail does not increase indefinitely as the camera lens is stopped down.[2] It increases until it reaches a maximum and then, one stop further, it becomes zero; then not even the plane of sharpest focus exhibits the desired definition. It is thus important to know the optimum aperture for a given set of conditions. In this way the photomacrographer can ascertain the maximum depths available for various subjects and also find the factors that will yield them.

Another interesting point that is not often realized about depth phenomena is that, for a given final print magnification, the greater the proportion of this contributed by the camera magnification, the greater the depth of detail. The reason for this will be made apparent in the analytic section. Briefly, the over-all print magnification dominates the amount of depth and the depth does decrease as this goes up. Yet the photomacrographer should know that the total depth of detail will be greater as the camera magnification approaches the final magnification. Therefore, he should utilize the highest negative scale he can set with his equipment.

The total depth is of more interest in photomacrography than the near and far limits themselves. Subjects are so small that it would be difficult to measure to the plane of sharpest focus. For practical purposes the total depth can be approximately divided in half by the plane of sharpest focus. One of the reasons is that the near detail is enlarged to a slightly greater extent than the far parts; also, longitudinal aberrations tend to add to the ordinarily shallow near depth. However, the author usually focuses about ⅔ of the way from the front limit of fairly large subjects, because when depth is scanty it is psychologically more satisfying to have the farthest detail a trifle more blurred than the nearest. Depth can be studied with the lens stopped down and the plane of sharpest focus adjusted accordingly. Such a procedure is also necessary with a lens that changes focus as it is stopped down. Photographic tests can be made to check the allocation of the depth.

The concept of total depth of detail can be gained from Figure 4, upper curve, and the way in which it diverges from the depth of field, lower curve, of ordinary photography seen. For the counterpart of this illustration, made for visual study, the camera magnification was X 4 and the enlargement X 3, yielding a final scale of X 12. Had the negative been made at X 12, more depth would have resulted, of course, and the effects of such variations are dealt with in the discussion of the depth-of-detail curves, Figure 5.

The lower curve in Figure 4 shows a limit of the classical depth of field when a circle of confusion equal to the criterion for tolerable definition of this paper is employed. This is 6 elements/millimeter and a specific example of exactly this deatil separation is exhibited by the single wing scale that is turned perpendicularly to the camera axis instead of at 45° like the rest. Teeth on this scale measure 6 to the millimeter on the visual print. As to be expected, there is not much difference in the two curves at the wider apertures. However, at the optimum aperture of f/14.25 the divergence is obvious. This shows how well the curves agree with practice.

The straight line marks the other limit at f/14.25. Com-

paring detail near this line at the other apertures will reveal the changes in definition involved. The short stroke indicates depth of detail at f/5.6.

It is also interesting to note that white spots near the region of sharpest focus increase in size as the lens is stopped down, due to diffraction and other blur effects. On the other hand, in the plane near the bottom, where the circle of confusion dominate the results, there is a bright white spot whose image diminishes in size with stopping down. These two opposing factors produce an optimum balance point where the maximum tolerable depth of detail can be obtained–here, f/14.25, for a depth of 0.57 millimeter.

Depth-of-Detail Curves

The curves in Figure 5 plot the most practical data obtainable from the expressions worked out in the analytic section. There are four sets of data involved: The basic (heavy) curve; the parametric depth curves for $m=1$, 2, and 5; the optimal aperture curves for f/8 to f/32; and the "defining power" curve (inset). These will be described in turn and their uses given.

It should be recalled that the depth data are based on a detail separation of 6 elements/millimeter in the final print. At the subject, then, detail separation is $6M$.

Basic Curve

The basic, heavy curve is the one that will most often be used. It is divided into two parts. The lower part to the right is made up from optimized depth-of-detail figures for prints from negatives made at high camera magnification ($m \longrightarrow \infty$). The upper part is the practical depth of detail at a fixed camera aperture of f/22 and was calculated for prints made at the same scale as the negatives ($m=M$). Since the author's lens does not stop down beyond f/22, the upper part is "optimum" in a practical sense. The full import of this selection of data is academic and can be gained from the analytic section. Here, it need only be understood that the most common conditions, and particluarly contact printing, are met thereby.

It will be apparent that an extension of the heavy portion of the $m \longrightarrow \infty$ curve would demand f-numbers beyond the f/22 of the lens used–the dotted extension of this curve (and of the other parametric curves) was included up to the f/32 point for the benefit of those who may have a suitable lens bearing this aperture.

For most applications the photographer will know the final print scale, M; he can then read the depth of detail in millimeters, T, from the heavy curve. Sample figures are:

M:	2.5	5	8	10	15
T:	8.5	3.2	1.6	1.1	0.5mm

The selection of M in relationship to the desired detail separation, s, has been explained already in connection with the useful magnification curves.

The depth of detail given by the basic curve is intended mainly for moderate enlargements and for a camera aperture of f/22. It will be less when: (1), the negative magnification is much less than the final print scale and when; (2), f/22 is employed for negatives to be printed to final scales of over $M=10$. The first of these two considerations is now taken up.

Parametric Curves

In the region where the proportions of camera and enlarger magnification are critical, curves have been plotted essentially parallel to the lower portion of the basic curve. They indicate factors for $m=1$, $m=2$, and $m=5$ –and the lower portion itself represents those for $m \longrightarrow \infty$.

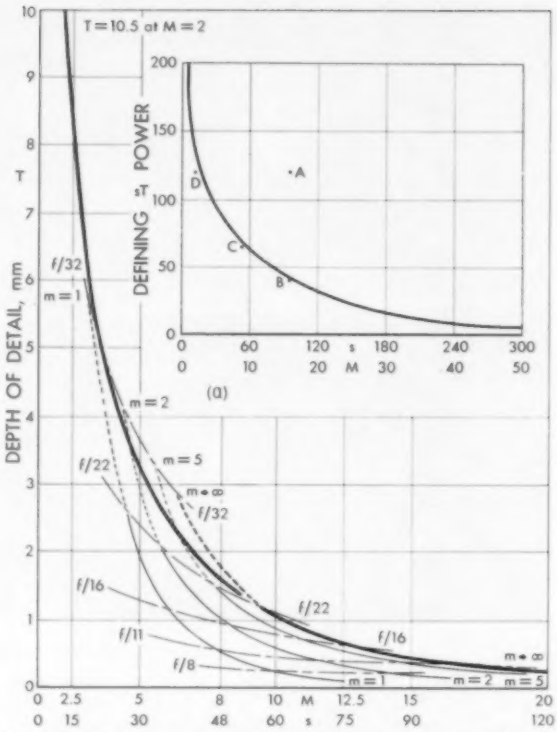


Figure 5—Working curves for determining optimum depth of detail. The inset curve, 5a, indicates the defining power, "sT," of the system. The method of using these curves is outlined in the text.

Key: "M" is over-all magnification; "m" is camera magnification; "s" is detail separation in elements/millimeter; "T" is partly optimum and partly practical (see text) depth of detail in millimeters. The letters "A," "B," "C," "D," on 5a refer to conditions discussed in the text.

When a $\times 10$ print is to be made from an $m=10$ negative, the depth will be practically that shown by the basic curve ($T=1.1$ millimeters), because a parametric $m=10$ curve would be very close to the $m \longrightarrow \infty$ curve. This depth would not be obtained however, with say, an $m=2$ negative. The way that depth varies with camera magnification in this region can be noted from the following figures obtained from the parametric curves at the $M=10$ and $M=8$ absissae:

M = 10	m:	1	2	5	∞
	T:	.2	.6	.9	1.1
M = 8	m:	1	2	5	∞
	T:	.6	1	1.4	1.6

Obviously, the camera magnification should be made as great as possible.

In finding these figures, the photomacrographer has by now encountered the optimal aperture curves (dashed lines). These are explained next.

Optimal Aperture Curves

It should be remembered that the parametric curves just described are calculated from the aperture for optimum depth (see Figure 4); they show this optimum

depth, but not the aperture at which it is obtained. To indicate optimal apertures the dashed curves have been drawn across the parametric curves at values for the marked f-stops on the camera lens. To obtain the depth shown by a point on a parametric curve, the camera f-number, N, must be set in accordance with the stops indicated. For example, when $m = 1$ and $M = 5$ there is a depth of detail, T, of 2 millimeters—provided $N = 20$. This can be seen by noting that the point for $m = 1$, $M = 5$, $T = 2$, lies about 4/6 of the distance along the $m = 1$ curve between f/16 and f/22. In practice, setting the aperture pointer at a given stop or halfway between stops, is close enough.

For practice, the optimum point for Figure 4 can be found by interpolating between $m = 2$ and $m = 5$. First though, the following sets of factors could well be located for a good understanding of the optimal aperture curves.

s:	36	36	48	48	54	90	120
M:	6	6	8	8	9	15	20
m:	2	5	1	5	5	5	20
T:	1.9	2.6	0.5	1.4	1.1	0.4	0.25
N:	22	22-32	11	22	16-22	11	11

In an actual photomacrographic problem, as the above table suggests, detail separation needs probably would first establish M. Then the depth requirements would lead to the selection of an appropriate camera magnification. And finally, the camera aperture would be found. Should one or more of the values for these factors demanded on Figure 5 not be attainable, compromises would have to be made. In general, detail separation is usually sacrificed for depth by making prints at smaller final magnifications, but within the other conditions of Figure 5. Thereby more of the subject is included and photographed at a good general sharpness. In contrast, it may alternatively be necessary to work outside these conditions; optimal apertures, and hence the sharpness criterion of this paper, are then foregone.

Sometimes it is possible to arrange or cut the subject in such a way as to reduce depth requirements. This is a desirable approach. In any event, Figure 5 will be of great help in juggling factors. It will also be of value in determining the practicality of a proposed photomacrographic project and thus aid in planning the program.

Defining Power

There is size-limitation effect encountered in photomacrography that is bound up with depth of detail. It can best be described through an example: A final print size of, say, ten inches can be readily achieved when the subject is a Galapagos tortoise. Yet a ten-inch print of a ladybug, which has about the same shape, would be very disappointing from a sharpness standpoint. Satisfactory detail could be obtained in a shallow depth zone, but not throughout the beetle form, as would be the case with the tortoise form. The beetle depth zone could be "increased" by stopping down the camera lens for homogeneous definition over the entire body, but the detail separation would be unacceptable.

This effect arises because, as subjects become very small, detail elements approach the size of various physical limits in the recording system. A common experience will help to clarify this.

A mountain viewed through the wrong end of a telescope could appear to have the same final size as a molehill on its slope that is observed through the right end. Large boulders could provide the limiting detail elements in the former case and small balls of earth in the latter.

Yet the mountain and the boulders would look sharper than the molehill. The introduction of magnification for imaging the lumps of earth has reduced what is going to be called "defining power" in this paper. This is not resolving power; the telescope actually resolves smaller elements when used the right way around.

Defining power is associated with the final image; however, figures both for specifying it and for applying the concept to practice, can be obtained from the subject.

Defining power is to be the ratio of the optimal or practical total depth of detail, T, over the width of the detail elements at the depth limits. This width is the reciprocal of the detail separation s. Again, s has been defined as $6M$. Therefore:

$$sT = 6MT$$

In order to find the defining power for the camera lens used in this investigation (and for similar lenses), Figure 5a has been plotted from the basic curve in Figure 5. Other defining-power curves can be plotted from any depth-of-detail or depth-of-field data to suit individual needs.

The defining power, in Figure 5a, is plotted against the detail separation and overall magnification. The photomacrographer usually knows s and the depth of his subject. He can multiply these together and find out whether the defining power curve permits his value at a given s absissa. Should his value fall on or below the curve, his subject can be photographed satisfactorily and he can refer to Figure 5 for technical factors. Should his value lie above the curve, the subject will have to be changed, rearranged or discarded.

The concept of defining power can be further illustrated by considering a common subject from ordinary photography and then photomacrographic subjects will be compared in connection with Figure 5a.

First consider a medium-sized pet cat. A half-scale "portrait" is to be made. The depth of the subject is about 65 millimeters. The guard hairs in the fur are the desired finest detail to be separated; they measure 0.16 millimeter in diameter. Accordingly, the subject calls for a detail separation of $1/(2 \times 0.16)$, or 3, (see p. 42 and Appendix). To determine whether the proposed photograph is feasible, note that M is going to ½ and that $6M = 3$; therefore the scale is suitable for reducing the subject detail to the limit of six elements/millimeter at the print. The defining power needed by the subject is 3×65, which equals 195, at $M = ½$. A classical depth-of-field curve would be almost the same as the basic curve of Figure 5 in the $M = 1$ region; hence a similar defining-power curve would be obtained. And from 5a it can be noted that a defining-power of 195 is possible at $s = 3$; this point is below (i.e. to the left of) the curve.

Checking ordinary depth-of-field figures shows that at f/32 a depth of 64 millimeters can be obtained for the circle of confusion adopted in this paper—0.33 millimeters. Therefore, from subject calculations, from 5a and from depth-of-field-calculation standpoints, the depth and the defining power needed are shown to be provided. That is,

the defining power called for by the subject is closely met by the proposed photographic factors, and this is predicted by the point falling below the curve.

Apart from yielding some easy practice in the type of arithmatic the photomacrographer needs to do, the above example merely demonstrates what is already well-known —a satisfactory portrait of a cat *can* be made. But what if a full-length photographic record of a fruit fly with eye setae (hairs) sharp is to be made—can it be done? Average dimensions of Drosophila melanogaster in millimeters are:

Length	2.8
Width of face	0.74
Width across wings	1.2
Depth of eye	0.18
Median diameter of eye setae	0.005
Approximate diameter of eye facets	0.009

By arranging the fly so that a line along the near eye and the edge of the near wing is perpendicular to the lens axis, the depth requirement could be confined to the width across the wings, 1.2. The detail separation has to be $1/(2 \times 0.005)$ or 100, if we are to record the eye setae as tapered hairs rather than blobs. The defining power is thus 100×1.2, or 120, at the $s = 100$ ordinate. This is point "A" on Figure 5a—obviously the picture cannot be made.

However, the requirements for a profile "portrait," with the eyes and setae sharp, are not so stringent. (T would be about ⅓ the width of the face, say 0.4 millimeters.) Here the defining power is 100×0.4, resulting in a practical proximity to the curve at point "B."

Other factors for picture "B" can now be obtained from Figure 5. Note that $s = 100$, $M = 16.6$, $T = 0.4$ and the optimum aperture is $N = 12$. The defining power—$sT = 40$—from the data is seen to agree with that calculated from the subject. (To correspond with these figures, the camera magnification should be as close to 16.6 as possible.)

To find out what type of record can be made of the entire fly body, find by trial a value for s on Figure 5 that will make $s \times 1.2$ (for the width across the wings $T = 1.2$) fall on or below the curve of Figure 5a. Such a point is "C" and the technical factors are: $s = 54$, $M = 9$, $T = 1.3$, $N = 22$. It should be noted that the defining power calculated from the subject is 54×1.2 equals 65; since the factors yield slightly more than enough depth, 1.3, "C" falls below the curve and the potential defining power of the system is 54×1.3, or 70, which is adequate.

Working the expression for s in reverse yields, when x represents the width of the detail separated upon utilizing the above factors:

$$\frac{1}{2x} = 54$$

$$x = 0.009$$

Then x corresponds closely to an eye facet on the fruit fly. Of course, the setae will not be more than blobs in this photograph.

To summarize conditions "A," "B," and "C": The entire body of the fruit fly can be photographed at $\times 9$ with reasonable sharpness and the eye facets should be resolved. The profile head of the fly can be photographed at about $\times 17$ and most setae should be resolved into tapered hairs. This corresponds very closely with practice.

There is another well-known fact that can be explained through Figure 5a. The photograph of an accurate scale model of an insect is technically (if not scientifically) more satisfactory than the image of the actual insect, both to the same final scale. We can apply this to the fruit fly. Point "A" leads to an unsuccessful result when $M = 16.6$; but with an $\times 8.3$ scale model, M need only be 2 for images of the same size. The following requirements then appear:

	s	M	T	N	sT	
At model:	12	2	10	..	120	(point "D")
From curves:	12	2	10.5	22	126	

Point "D" is just below the curve, indicating a feasible record can be made. The model would be about the size of a bee, and it is well known that the latter can be photographed much more easily than a fruit fly. In practice, the model would probably be large enough for ordinary photography in the size-range of a small cat. This would make its recording even more simple.

This paper has explained why it is not possible to photograph very small objects at high magnifications with good overall sharpness. It has shown how to minimize, and sometimes eliminate, the imperfections arising out of low defining powers. Withall, it should not be overlooked that many useful technical photographs can be and are made which have to show unsharp limits.

Those who use and view photographs should realize that the shortcomings are not the fault of the photographers. The latter also should appreciate the limitations of the process, so that they will not expect too much nor fail or get the most quality possible from a given situation. By knowing the factors involved, both groups will be able to approach problems and results with discernment.

At first glance many photomacrographs may appear dissapointing. It should be remembered that they are made for imparting information, not for looks. Therefore, the better the lens and the finer the resolution of the film, the more useful the result. These factors will produce a photograph that may not look as good as one made with other less exact lenses and films. The reason is that the optimum factors will produce a more obvious difference between the sharpness of the plane of sharpest focus and the limits of depth of detail. Nevertheless, they will concomitantly extend the *useful* range of these limits. This does not mean that the esthetic aspect should be neglected, because the avoidance of distracting elements in the photographs, through suitable selection and arrangement of the subjects, also enhances clarity.

ANALYTIC SECTION

Several surprising and valuable findings arise out of the analyses that support and provide the practical working information in Figures 2 and 5. The photographer will gain a better understanding and appreciation of photomacrographic problems if he merely reads through the following material. Of course, should he wish to plot curves for special applications, he can study the discussion more thoroughly.

The physical blur circles listed in Table I are here called "circles of definition," because they affect the image-producing capabilities—called "detail separation" in this paper—of the camera-enlarger system in a manner similar to the circles of confusion of depth-of-field considerations. The capacity of the system for separating and recording fine subject detail will depend upon the size of the cumulative blur in the print, just as the circle of confusion poses limits of tolerable definition. In photomacrography this cumulative blur should be taken into account; the usual depth formulas, satisfactory for ordinary photography, do not do this.

A Modified Circle of Confusion

Depth-of-field values, classically, are calculated from purely geometric assumptions concerning the object space. The formulas are based on a tolerable blur circle—the circle of confusion—which can be referred to the image in the final print. To obtain realistic depth figures for photomacrography, a blur circle made up of the aggregated circles of definition in the photographic system must be convoluted with the geometric confusion blur.

It is then possible to determine an effective circle of definition in the subject or in the final photograph.

If these two blurs are considered as Gaussian spread functions, then the sigma value of their convolution is equal to the square root of the sum of the individual squared sigma values. It has been found that the effective diameters of such blur circles are closely proportional to these sigma values.[5] Conceptually then, it is convenient to find a blur whose area is the combined area of the component blurs; this can be done to within 5 per cent accuracy.[6] Such a blur, referred back to the subject, is indicated by i in the equation below.

In other words, if the diameter of the physical blur from diffraction, aberration and diffusion in the photographic system, referred to the subject plane, is d; and if the diameter of a realistic blur from geometric depth-of-field considerations, also referred to the subject, is c; then their convoluted diameter is:

$$i = \sqrt{c^2 + d^2}$$

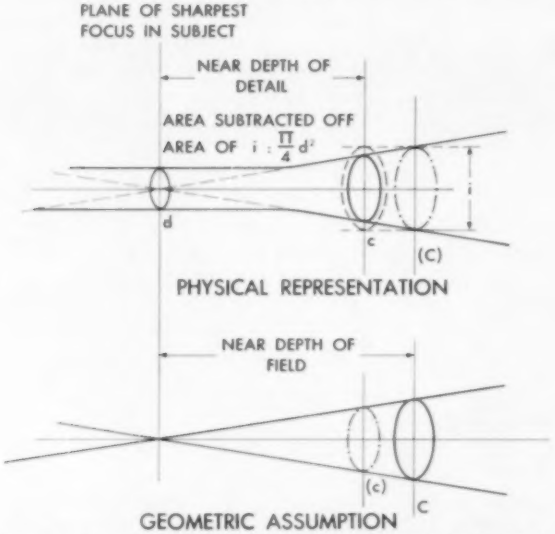


Figure 6—Comparison between depth-of-detail and depth-of-field relationships. Key: diameters indicated by letters as follows— "d" is physical blur, referred to subject—"C" is ordinary (geometric) circle of confusion at subject—"c" is modified (geometric) circle of confusion at subject—"i" is image circle of definition referred to subject.

Figure 6 shows the geometry of this modified circle of confusion c. It also shows how i can be set to correspond to any suitable classical geometric circle of confusion, C.

The diagram makes a distinction between depth of field and depth of detail. The reason for this is that depth-of-field formulas indicate a region of tolerable sharpness; yet there is no provision in them for determining when the lack of detail separation within the range becomes intolerable, because there is no allowance for the physical blurs. From the formulas to be developed for "depth of detail," on the other hand, it will be possible to find a range possessing the desired detail separation out to the limits. And the physical blurs will be taken into account.

Figure 6 also implies that there is a homogeneous tunnel-like focal region that can be referred to the negative, rather than a geometric crossover. This will be justified in the last section of the paper.

In the discussion now to be presented, the way in which i is obtained from studying practical photomacrographs will be shown. Also, an expression for evaluating d will be developed. Then the diameter of the geometric component, or modified circle of confusion c, of the convoluted blur circle i can be determined, for:

$$c = \sqrt{i^2 - d^2}$$

Values for the total depth of detail, T, will be obtained from c and compared with the depth of field from C—both as functions of N, the marked f-number of the camera. It will also be shown that for a given set of technical parameters there is a predictable aperture N_{Tmax} that yields a maximum value for T. Early in the development it will be enlightening to examine the special case of the above expression when c equals zero, for this is the condition of no depth. Thereby the factors for photographing 2-dimensional subjects at the most useful magnification are going to be revealed.

Subject Circle of Definition

To find a tolerable value for i, it is most practical to examine its diameter referred to the final photograph through the agency of the over-all magnification M. Thus if I is the diameter of the image circle of definition in the final print:

$$I = Mi \text{ and } i = \frac{I}{M}$$

There are two reasons for this referral. First, from a philosophical standpoint, the circle exists as an actual disc in the photograph—it is only a mathematical convenience at the subject. Second, it can be estimated from measurements made on actual photomacrographs. Once this has been done it can be projected back to the subject for the familiar depth-formula manipulations.

While the image-circle diameter referred to the subject, i, will be employed for considering depth of detail and useful magnification, and C will be adopted for finding the depth of field, comparable *limit values* can be set, of course, for both circles.

Then:

$$C = \frac{I}{M} = i$$

Their basic difference lies in the fact that for 2-dimensional subjects C becomes zero, whereas i reduces only to d.

A VALUE FOR i

The detail separations on many good photomacrographs were measured and judged to be 6 elements (or "lines")/millimeter. Further justification for selecting this criterion to find a fixed circle at the print will be given under "Values for Computation." In this analysis the detail-separating capabilities of individual or of summated blurs is held analogous to the resolving power of two Airy discs. This has been found to yield sufficient practical accuracy, especially for line detail.

When photomacrographic detail elements comprise setae or ridges that are as wide as the spaces between them, they resemble the photographic, low-contrast, bar chart. The concept of detail separation then parallels that of resolution. Detail separations, in elements/millimeter at the print (and sometimese the negative), and at the subjects are indicated by S and s respectively. A "bar" and a space is considered as one "line." It is not possible to truly specify S as an objective quantity; however, its practical status will be described in connection with the evaluation of r in the computation section.

From Airy disc considerations, the following relationships will be adopted:

$$S = \frac{2}{I} = \frac{2}{Mi} \text{ and } s = \frac{2}{i}$$

Hence:

$$I = \frac{2}{S} \text{ and } i = \frac{2}{s} = \frac{2}{MS}$$

This yields the diameter of the final tolerable print blur projected back to the subject.

Summation of Physical Blurs

The next factor to be examined is d, the effective diameter of the physical blurs in the photographic system. By means of the previously established method of convoluting circles, the summation of the various component diameters can be made by the formula:

$$d = \sqrt{d_1^2 + d_2^2 + d_3^2 - - - - - - d_n^2}$$

It should be noted that the factor $\pi/4$ cancels out, and that $d_1 - d_n$ are individual blurs.

SPECIFICATION OF PHYSICAL BLURS

It is necessary to specify certain conditions under which the sizes of the blurs are considered so that they can be summated for deriving working equations. They are first all referred back to the subject to form a subject circle. Hence, with one exception ("r," below), their actual diameters have to be divided by either the camera magnification m, or the over-all magnification M, depending on whether they are regarded at the negative or the print, see Figure 7. Since the symbols to be adopted will designate the *actual* diameters *squared*, the *referred* diameters squared, below, involve the appropriate magnifications squared.

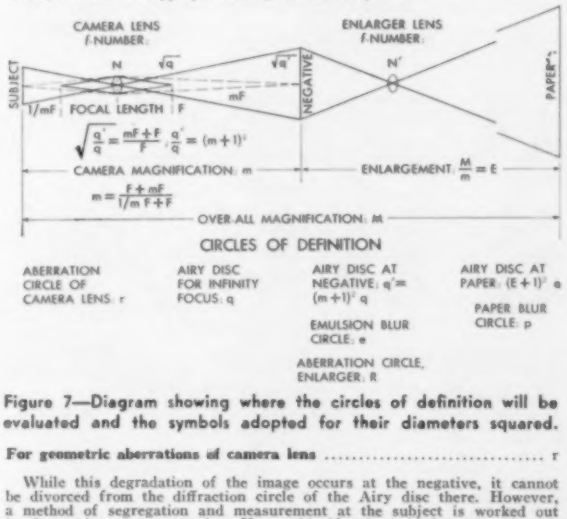


Figure 7—Diagram showing where the circles of definition will be evaluated and the symbols adopted for their diameters squared.

For geometric aberrations of camera lens ..... r

While this degradation of the image occurs at the negative, it cannot be divorced from the diffraction circle of the Airy disc there. However, a method of segregation and measurement at the subject is worked out in the section on computation. Hence this blur is to be located and evaluated at the subject. It is also assumed that, for applications in photomacrography, the size of this blur at the subject does not vary to any practical extent with longitudinal aberration, camera aperture or magnification. This hypothesis will be justified further on.

For Airy disc of camera lens ..... $\frac{z(m+1)^2N^2}{m^2}$

The usual calculation for the Airy disc at infinity focus contains a constant factor based on the wavelength of the light and a variable depending on the angle subtended by the exit pupil. To simplify Figure 7, the symbol q has been entered; but it is necessary to take this angle into account, because it will vary with camera magnification at the negative and with the f-number, N. By inspection of the diagram, the way to allow for the former will be apparent. To free N for subsequent operations, the square of the constant factor is called z.

For emulsion blur circle ..... $\frac{e}{m^2}$

This blur results from the graininess and turbidity of the negative emulsion.

For aberrations of enlarger lens ..... $\frac{R}{m^2}$

The author uses the same lens for both camera and enlarger. Hence, the aberration circle here is treated like r, and is considered at the negative.

For Airy disc of enlarger lens ..... $\frac{n}{M^2}$

The size of this circle will vary with the enlargement $E(M/m)$ and with N'. However, the computations are much simpler when M/m is not permitted to produce such variability. It is desirable, and practical, to hold the *effective* enlarging aperture, $N'(E+1)$, constant at the enlarger —fe/50. The diameter squared of the Airy disc at this effective aperture is called n. It equals $(E+1)^2zN'^2$.

For paper blur circle ..... $\frac{p}{M^2}$

This circle is similar to the one at the negative. When contact printing is considered, the factor can include an allowance for diffusion caused by the printer.

Obviously, the areas of the above blurs will depend on the lenses and materials used. The author utilizes for most photomacrographic work the 2-inch, f/4.5, Kodak Enlarging Ektar Lens, Kodak Panatomic-X Film and glossy Kodak Medalist Paper.

The methods of this paper can be applied to other equipment, and they also allow the insertion of refinements like acutance and spread functions and factors like unavoidable manipulative blurring or a television raster.

Utilizing the Modified Circle

It is now possible to determine the expression for c, starting from the set value I and the relations:

$$i = \frac{I}{M} \text{ and } i^2 = c^2 + d^2$$

$$\frac{I^2}{M^2} = c^2 + r + \frac{z(m+1)^2N^2}{m^2} + \frac{e}{m^2} + \frac{R}{m^2} + \frac{n}{M^2} + \frac{p}{M^2}$$

$$c = \sqrt{\frac{1}{M^2}[I^2 - (n+p)] - \frac{i}{m^2}[z(m+1)^2N^2 + (e+R)] - r}$$

Since c is a modified but geometric circle of confusion at the subject, the usual formula for depth of field can be applied for depth of detail, provided this circle is adopted. Again, because c is determined from a fixed circle in the print, M is the magnification involved in the formula. The total depth can be expressed in the usual way:

$$T = \frac{v\,c}{D-c} + \frac{u\,c}{D+c}$$

Now, even in the photomacrography, c^2 is relatively small compared with D^2. Hence the following common transformation can be made:

$$T = \frac{2\,N\,(M+1)}{M} \cdot c$$

and this is the formula that will be utilized for computing depth of detail.

Before the formula can be usefully applied, it will be necessary to know a reasonable value for M to employ with a given subject having detail elements of a specific separation. This can be obtained by first examining the concept of useful magnification as applied to two-dimensional subjects.

Useful Magnification

The purpose of finding an expression for M is to provide a means for indicating all the enlargement capabilities of the system and to determine when empty magnification will begin. A given system has the capacity for separating $2/i$ elements/millimeter in the subject. The over-all magnification expands this separation and when the degree is M, s has been expanded to S, which is 6 elements/millimeter. Now the capabilities s and i are inherent in the system. Hence:

$$M = \frac{I}{i} = \frac{s}{S} \text{ and } SM \text{ or } 6M = s$$

A print having a greater over-all enlargement than M exhibits empty magnification, because s is merely expanded beyond S; no new detail is disclosed, for the system is not capable of separating finer detail.

On the other hand, an over-all magnification of less than M records $M \cdot x$ finer than $S=6$. The desired detail could be observed with a loupe, provided the capabilities of film, enlarger and paper have not been exceeded. Yet the print is "sharper" than it need be.

This concept has great practical value. It has been discussed more fully from that standpoint in the section on reading useful magnification curves. The same considerations hold for considering the separation at the limits of the depth of detail. A value s can be read off Figure 2 and the corresponding value M can be compared with magnifications attainable from Figure 5.

The expression for useful magnification can be obtained by noting that for two-dimensional subjects T equals zero, as does c. Formulas for plotting curves for both useful magnification and optimized depth of detail will now be worked out.

Formulas

First, the equations that were utilized for plotting Figure 2 can be derived by setting c equal to zero.

LIMITS OF USEFUL MAGNIFICATION

$$I^2 = M^2\left\{r + \frac{1}{m^2}\left[z(m+1)^2N^2 + (e+R)\right]\right\} + \frac{1}{m^2}(n+p) \quad (1)$$

It is now possible to solve for M as functions of m and N.

$$I^2 = (n+p) + M^2\left\{r + \frac{1}{m^2}\left[z\,(m+1)^2N^2 + (e+R)\right]\right\}$$

$$M = \sqrt{\frac{I^2 - (n+p)}{r + \frac{1}{m^2}\left[z\,(m+1)^2N^2 + (e+R)\right]}} \quad (2)$$

It will be noted that for contact printing m equals M and that n and R are not involved. Equation (1) can then be transformed to:

$$m = \sqrt{\frac{[I^2 - (p+e)]\,(r + zN^2) - rzN^2 - zN^2}{(r+zN^2)}} \quad (3)$$

An interesting feature of Figure 2 is that it shows contact printing does not necessarily produce the best definition in the print. It will be seen that when m is made very large and the negative is reduced instead of being enlarged, M can sometimes be greater than the scale for contact printing. The difference is more academic than practical, largely because of the difficulty in focusing a reduction "needle" sharp. The defining equation is:

$$m \Longrightarrow \infty \quad M = \sqrt{\frac{[I^2 - (n+p)]}{(r+zN^2)}} \quad (4)$$

Here the blurs in the negative disappear (e and R), because the enlargement approaches zero. Further, practical use can be made of Equation (4) in determining r, as described subsequently.

There may be occasions when a variable such as $(E+1)^2Q$ in the basic specification of blurs cannot be reduced to a simple term like n. With the resulting expression it is useful to utilize E as a parameter. Equation (2) then expands into the following, which has been arranged for ease in computation:

$$M = \sqrt{\frac{(r+zN^2)\,K - E^2rzN^2 - EzN^2}{(r+zN^2)}} \quad (5)$$

where

$$K = [(I^2 - Q - p) - 2EQ - E^2\,(Q + e + R)] \text{ and } Q = zN^2$$

DEPTH AS A FUNCTION OF CAMERA APERTURE

Utilizing the expression for c, the formula for the total depth of detail becomes:

$$T = \frac{2(M+1)}{M} \times N\sqrt{\frac{I^2}{M^2} - r - \frac{I}{m^2}\left\{z(m+1)^2N^2 + (e+R)\right\} - \frac{I}{M^2}(n+p)} \quad (6)$$

This can be simplified to:

$$T = aN\sqrt{b - N^2} \quad (6a)$$

where

$$a = \frac{2\,z^{0.5}\,(M+1)\,(m+1)}{Mm}$$

and

$$b = \frac{m^2}{z(m+1)^2}\left\{\frac{I^2 - (n+p)}{M^2} - \frac{(e+R)}{m^2} - r\right\}$$

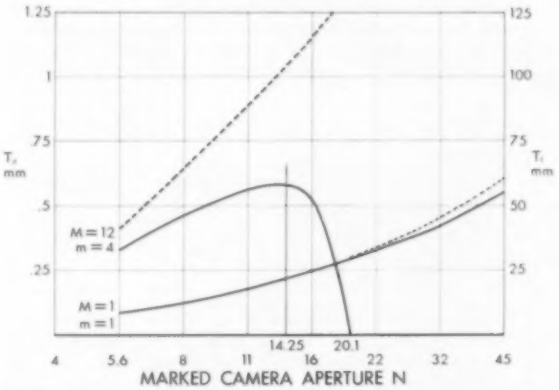


Figure 8—Curves comparing the depth of field of geometric optics with the depth of detail of photomacrography. Key: "T_d" is depth of detail, "T_f" is depth of field (both in millimeters) and "N" is camera lens aperture. Upper curves—dotted line indicates the geometric depth of field specified for a print at X 12 magnification; solid line shows depth of detail when a X 4 negative is enlarged to a X 12 print. Lower curves—dotted line indicates the geometric depth of field for 1:1 photography; solid line shows the depth of detail in a print from a 1:1 negative.

Equation (6) gives us a means for calculating T_N as a function of N when M is known and m is made a parameter. Figure 8 compares the depth of detail calculated from this equation with the depth of field of geometric optics.

From the derivative of Equation (6a) with respect to N we can find the aperture that yields the maximum depth for a desired M at any negative magnification:

$$T' = \sqrt{\frac{a\,(b - 2N^2)}{b - N^2}}$$

By setting T' equal to zero and testing the result over the range in which we are interested, we get:

$$N_{Tmax} = \sqrt{\frac{b}{2}} \qquad (7)$$

Substituting this value in Equation (6a) we find that the maximum depth is:

$$Tmax = \frac{a\,b}{2} \qquad (8)$$

It should also be observed that T is zero when $N^2 = b$, which is one stop smaller than the optimal aperture. Beyond that, T, mathematically, becomes imaginary, and the definition, practically, becomes intolerable throughout.

Equation (7) will yield the optimal aperture for a desired final print scale for any combination of negative and print scale. Figure 9 shows a plot of the equation with m as a parameter. However, the curves do not yield the magnitude of the depth. This can be done by translation to the curves in Figure 10, which were plotted from Equation (8). Combining data from Figures 9 and 10 yields the working curves of Figure 5.

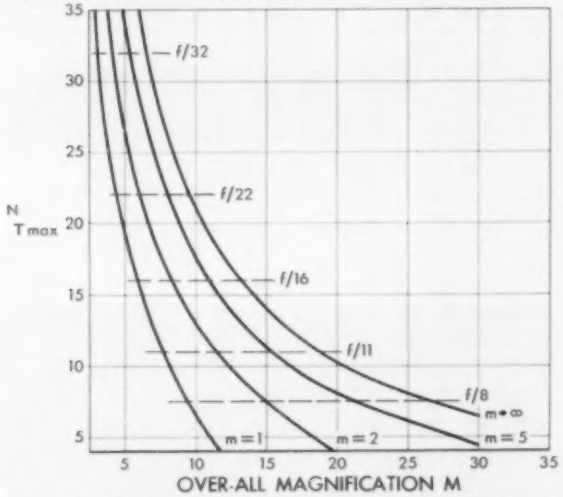


Figure 9—The f-numbers "NT_{max}," for achieving optimum depth of detail, at various overall magnifications, "M," for a range of camera magnifications, "m."

Equation (8) gives us the value for *Tmax*, the optimum depth of detail, as a function of m and M but it does not tell us at what f-number the value occurs. The latter figure can be obtained from (7), but this is also a function of m and M. It is, therefore, going to be necessary to attempt to find an efficient value for m, and this problem is now examined. From Equation (6) in can be seen that when $m \Longrightarrow \infty$, T approaches a maximum. However, (6) shows that a very great negative scale, coupled with reduction in the enlarger to arrive at the desired M, is hardly worthwhile for the slight benefits obtained. From the expression for b it will be seen that the factor: $-(e + R)/m^2$, reduces to zero and that only this lowest value for it is subtracted from the other figures for the image degradation.

On the other hand, when m is fractional, a relatively large quantity has to be deducted from the value of the surd, which reduces the value of T greatly. Hence, m must enter into calculations of depth of detail. The practical implication of this is that m should be made as large as possible with the equipment at hand, with good contact printing as the desirable limit. The surprise at this realization will be allayed when it is noted that M plays the dominant role in the depth change.

For the convenience of those who wish to compute curves for their own applications, the depth-of-detail equations are analyzed further.

The long form of Equation (7) is:

$$N_{Tmax} = \sqrt{\frac{m^2}{2z(m+1)^2}\left\{\frac{I^2 - (n+p)}{M^2} - \frac{(e+R)}{m^2} - c\right\}} \qquad (7a)$$

To find the limiting curve for Figure 9, let $m \Longrightarrow \infty$. This yields:

$$\lim_{m \Longrightarrow \infty} N_{Tmax} = \sqrt{\frac{1}{2z}\left\{\frac{I^2 - (n+p)}{M^2} - r\right\}} \qquad (9)$$

Equation (8) can be expressed:

$$Tmax = \frac{(M+1)m}{z^{0.5}M(m+1)}\left\{\frac{I^2 - (n+p)}{M^2} - \frac{(e+R)}{m^2} - r\right\} \qquad (8a)$$

To find the limiting curve for Figure 10 we can again let $m \Longrightarrow \infty$:

$$\lim_{m \Longrightarrow \infty} Tmax = \frac{(M+1)}{z^{0.5}M}\left\{\frac{I^2 - (n+p)}{M^2} - r\right\} \qquad (10)$$

When *Tmax* is zero we have:

$$\lim_{\substack{m \Longrightarrow \infty \\ T=0}} M = \sqrt{\frac{I^2 - (n+p)}{r}} \qquad (11)$$

We could also plot the conditions for contact printing on Figure 9. From Equation (7a) the following can be derived (n and R are not involved):

$$M = \sqrt{\frac{(r + 2zN^2)\,[I^2 - (e+p)] - 2zrN^2 - 2zN^2}{(r + 2zN^2)}} \qquad (12)$$

$$M = m$$
$$N_{Tmax}$$

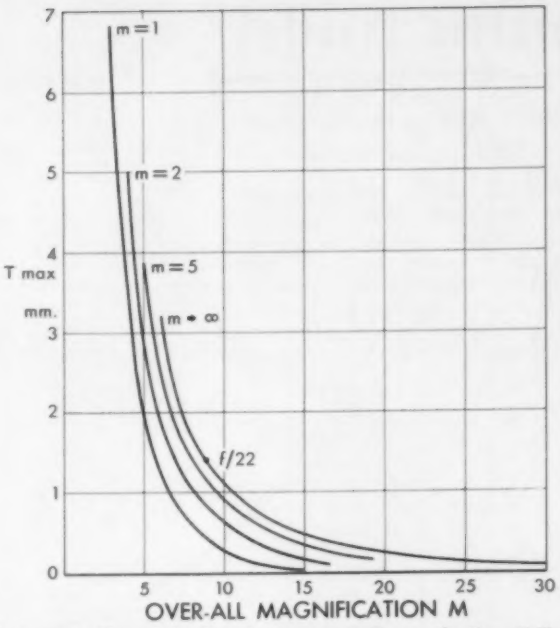


Figure 10—The relationships between over-all magnification, "M", camera magnification, "m", and optimum depth of detail, "Tmax." The curves have been terminated at N=35, on the left.

Values for Computation

The curves plotted from the equations depend on the values entered for the various blurs. These were defined earlier. Also, certain qualifications were placed on the aberration and final image circles. The justification for restricting r is bound up with finding a figure for it. The reason for setting the value for I where it is also warrants further discussion.

It should be recalled that the equations deal with the diameters *squared* of the various blurs.

Another important point is that the factor 10^{-4} cancels out through all the equations except in the expression for a in the depth formulas. Accordingly, this factor is *not* given below in the values listed, but it should be remembered when a is computed.

For r: Camera lens geometric aberration circle:

The value for r must be quite accurate because the effect is multiplied by M in the print. It is, of course, impossible to actually separate the geometric aberration from the Airy disc. However, in the subject, when $m \Longrightarrow \infty$ in the empression for I^2, Equation (1):

$$i = \sqrt{r + zN^2} \qquad (13)$$

Then i becomes the effective diameter of the star image at the short conjugate of the lens (The negative blur drops out because it is relatively small, and does not have to be referred to the subject.) When r is zero, we have the expression for the theoretical resolving power of a lens with no aberrations. This resolution is plotted in terms of z to provide the upper curve in Figure 11.

Negatives at 30 and 50 magnifications were made with a 2-inch, f/4.5 Kodak Enlarging Ektar Lens. The subjects were micrometer slides and natural objects in photomacrographic setups. The slides were illuminated from both the side and the rear to reduce contrast to a photomacrographic range. The crosses in Figure 11 represent values of S/m, (s), obtained from actual measurements or estimated on the negatives and averaged over several examples. (For the conditions of Equation (13), S is considered at the negative and $m=M$.)

The values were inserted in Equation (4), noting that M equals $zI/2$, because:

$$s = \frac{2}{i} \text{ and } \frac{s}{2} = \frac{1}{i} = \frac{M}{I}$$

(Since negatives were studied rather than prints, n and p were not involved as they are in other applications of Equation (4).) Upon solving for r, it was found to be higher at f/4.5 than the almost equal values obtained at f/5.6 and f/8. From there on it was erratic (see inset on Figure 11), because zN became relatively large—necessitating impossibly accurate practical estimates of s. The lower curve and its dotted extension were plotted with the f/5.6 value. It corresponds to the locus of the crosses within experimental accuracy. The higher f/4.5 value was extrapolated to f/4 to adjust the lower curve.

The basis for relegating r to the subject lies in Equation (13). The star image appears on the short-conjugate side of the lens on a lens bench when the other conjugate is very long and carries the small source. Then the area associated with r can be treated as a reduced image of an imaginary blur at the long-conjugate plane. Now, if a negative is placed in the long-conjugate plane, the actual aberration blur can be hypothetically projected to it at the over-all magnification M. Conversely, when the point source exists in the short-conjugate plane, the real blur appears in the distant plane, but it can be translated to the source plane by the reduction $1/M$.

This is the operation implied in Equation (1). The expedient is necessary because r cannot be evaluated at the usual photomacrographic negative. But it can be considered at the subject, which is always in the short-conjugate plane.

In the derivations from Figure 11, the value for s was actually made from measurements in the long-conjugate plane and then referred back to

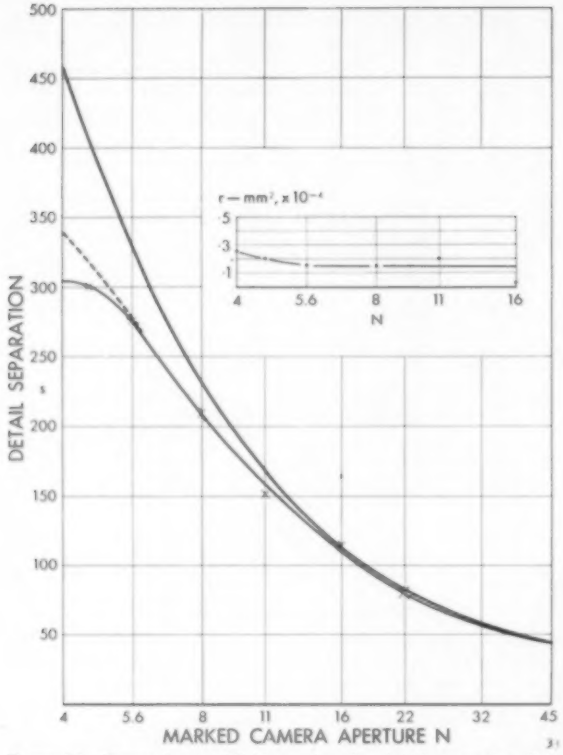


Figure 11—Curves for establishing values for detail separation, "s," and the size of the aberration circle, "r," for various camera apertures, "N."

the short-conjugate plane for separation at the subject via Equation (4). This emphasizes the subjective nature, based on practical results, of both s and r. The procedure is also mathematically convenient, because the aberration circle is not permitted to continuously vary with m and N like the Airy disc.

To facilitate work with other lenses, the star image of the lens under investigation was measured on a lens bench. It was found to be $(r + zN^2)^{1/2}$ when the central spot was focused as the smallest sharp disc obtainable. The first dark ring and the first light one were sharp and distinct, but the latter was narrow and not measured. In this way other lenses could be appraised and r found without going through the above steps.

Not permitting r to vary without restriction in the equations, assumes that the geometrical aberrations do not diminish enough to be detectable relative to the Airy disc as the lens is stopped down beyond f/5.6. This is a safe practical assumption, as evidenced by the contiguity of the curves in Figure 11. Another hypothesis is that the aberrations do not increase unduly, laterally nor longitudinally, at the smaller camera magnifications; this is reasonable for photomacrographic and good enlarging lenses, because they are corrected for finite conjugates. Practice supports this assumption.

At f/4 ..... $r = 0.254$
At f/5.6 ..... $r = 0.160$

For z; Factor (squared) for camera lens diffraction circle:

$2 \times 5460 \times 10\text{-}7)^2$ ..... $z = 0.0119$

For e; Negative emulsion circle:

A fine-grain emulsion, like that on Kodak Panatomic-X Film, has a resolution of about 100 lines/millimeter, when developed in Kodak Microdol Developer, with a high subject contrast. Raw photomacrographic illumination produces the effect of about a 4:1 lighting ratio on larger subjects. There are tone differences involved also, so that 8:1 was taken as an average subject contrast. When a negative density of 0.6 is considered as useful for shadow detail, the resolution can be placed at about 80 lines/millimeter.[7]

$(2/80)^2$ ..... $e = 6.25$

For R; Enlarger lens aberration circle:

It is assumed that the enlarging lens is as good as the camera lens. The author uses the lens mentioned for photography.

$R = 0.160$

For n; Constant enlarger lens diffraction circle:

The use of this simplification by employing fe/50 has been discussed.

$(50)^2 \times 0.0119 \times 10^{-4}$ ..... $n = 30.0$

For p; Paper emulsion circle:

The resolution of a glossy enlarging paper is about 130 lines/millimeter. However, halation confuses any relationship between resolution and spread function. Here an arbitrary factor of 5 is used to allow for paper diffusion. Since p is divided by M^2 in Equation (1), a more accurate figure is scarcely worthwhile. In contact-printing investigations, p should possibly be increased further when the effects of the printer are great enough to take into account.

$(2/130)^2 \times 5$ ..... $p = 12.0$

For I²; Final image circle:

Both for two-dimensional subjects and for depth-of-detail considerations, a viewing condition for the prints must be selected. Photomacrographic subjects themselves are usually observed through a loupe, therefore a center of perspective is somewhat indefinable. Accordingly, a comfortable fixed viewing distance is assumed here, 12 inches.

Good definition with sufficient depth of field is difficult to achieve in photomacrography; hence, too stringent a print circle should not be demanded. The diameter of the circle of confusion usually stated for miniature negatives is 0.051 millimeter at the negative.[8] For an average enlargement, say × 7, this becomes 7.357. To that should be added the losses of enlargement. The resulting 8 × 10-inch print renders about 5½ elements/millimeter at the depth limits. Hence I will be based on 6 elements/millimeter for quite critical photomacrographs.

$(0.333)^2$ ..... $I^2 = 1110$

Photomacrographic Conditions in the Focal Region

In adding the blur and confusion circles for deriving a formula for total depth of detail, it was necessary to make certain hypotheses about the nature of the image in the focal region. The validity of the assumptions is now examined and demonstrated.

Herzberger[9] has shown that the distribution pattern of light from a point source in the focal region is extremely complex. He has reproduced this at high magnification and shown how it varies through the region. It is also well known that there exist regions of greatest resolution and of maximum contrast in the vicinity of the focal plane. These can be demonstrated by photographing the aerial image of a point focus at high magnification, or their effects can be noted in specialized fields.

For ordinary three-dimensional photographic and photomacrographic subjects, the effects do not appear to an appreciable extent. These subjects are not point sources and their contiguous component images do not come to a given focal condition in the same plane. Hence, a theoretical point in one part of the subject would have its contribution to the focal effects masked by the spread of the adjacent points and diffused by the emulsion grains and turbidity. This is demonstrated in Figure 12, where very tiny, but finite, holes in a screen have been photographed at an angle. Depth-of-field effects are quite noticeable but there are no appreciable size irregularities near the focal region.

It is apparent that the energy in the overlapping Herzberger patterns is concentrated into a small and effectively homogeneous area. When the "point" focus of the camera lens is on an emulsion instead of at the focus of an optical magnifying system, it is too small to be resolved into a pattern by the emulsion. Therefore, it is safe to assume here that

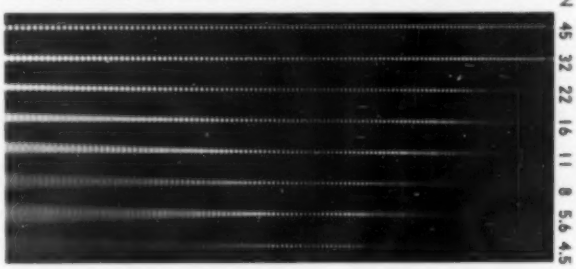


Figure 12—Holes in an accurate, fine screen photographed at an angle. Depth of field effects are evident but no perturbations in image size appear near the focal plane.

the referred image circle exists throughout the focal region and that only the out-of-focus circles of confusion tend to increase the size of this image circle on either side of the focal point from any practical element in the subject. Another factor that helps this concept for photomacrography is the relatively narrow angle of view—the spread of the Herzberger patterns increases with the angle between the lens axis and the image.

Appendix

Those wishing to draw working curves for depth of detail in their own field may want to know the details of combining Figures 9 and 10 to obtain Figures 5 and 5a. The lower part of the basic curve is from the $m \longrightarrow \infty$ parametric curve (Figure 10) plotted to f/22. This point (f/22) was found on the Nr_{max} ordinate of Figure 9 and it will be seen that the corresponding value for M is 9.5. At the $M = 9.5$ abscissa on Figure 10, the value for T is 1.2, and this value marks the f/22 point on the $m \longrightarrow \infty$ curve. All the other f-stop levels were found in the same way in order to yield the optimal aperture curves.

This lower portion of the basic curve provides a good general depth curve, because in this region the depth obtainable with any reasonably high camera magnification is practically the same as the theoretical optimum depth indicated by the $m \longrightarrow \infty$ curve.

Since the author's lens can only be stopped down to f/22, it was necessary to use a modification in the $m \longrightarrow \infty$ curve for M less than 9.5 (although a dotted extension to f/32 has been included for the convenience of others). Hence equation (6a) was computed with $M = m$ and $N = 22$. This yields the upper part of the basic curve. It indicates a fair average depth, for most conditions, with the lens stopped all the way down. It is also close to the optimum depth locii and to the results obtainable with a practical proportion between camera and print scales. The curve swings across the parametric curves, from $m \longrightarrow \infty$ to $m = 1$, at points readily attainable in practice and avoids reductions during enlarging.

The defining power is derived from the ratio of the depth of detail (or it can be obtained from depth of field in many applications) to the width of the smallest element satisfactorily rendered at the depth limits. Detail separation, s, is given in elements/millimeter where an "element" is an entity (such as a hair) plus a space, just as a bar plus a space constitutes a "line" on a resolution chart. The width of an element is $1/s$; hence, defining power is sT. When a definite entity is involved, rather than an estimated or known figure for s, it should be noted that $1/s$ is twice the width of the entity.

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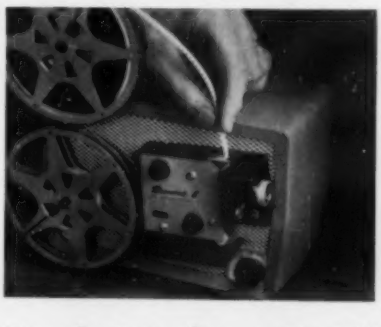

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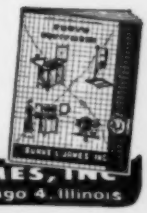

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"It Can Happen To You"

By Al. Morton, FACL, APSA, FACI

In case you are wondering about the title, it refers to GOOD MOVIES. Good movies can happen to you just as surely as they can happen to any other movie maker. However, they wont just happen. You have to do something to make them happen. It may be possible for photographers in some of the other branches of photography to come up with an outstanding picture, accidentally, once in awhile, but I can assure you that it doesn't happen that way with movies.

Good movies are always the result of careful planning and d- - - hard work. Now there's nothing startling about a statement like that, nor is anyone likely to become offended by it. What's worrying me is what will happen when I expand that statement a little and go into detail regarding it. Especially the hard work part of it. For what I am about to say will be straight from the shoulder and without any embellishment or apologies.

First, an observation about the planning. You can save yourself untold time and trouble, as well as money, if you will do it AHEAD of time. And by that I mean before any of it is recorded unalterably on film. While it may be possible to take footage you already have, and by careful planning, make it into an interesting or even outstanding movie, I'm sure that anyone who has ever tried it will agree with me that it is extremely difficult to ever come up with anything outstanding by going about it backwards. Then too, there is always the risk, in fact it's almost a certainty, that films which are not planned ahead of time seldom if ever become movies at all but remain forever, nothing but footage.

No doubt everything I have said, or that I am about to say, has been said many times before. I only hope that I might say it a little bit differently or add a little bit too that might help some newcomer become a better movie maker. For if our hobby is to grow and advance, the experienced must help the inexperienced and pass on to him what knowledge has been gained. The newcomer, too, is expected to contribute something of his own and pass it on to those who follow him.

For the amateur's field is not to ape Hollywood, only on a smaller, or amateur scale. He has a separate and distinct field of his own somewhere between the pot-shooter footage collector and the so-called industry. Why worry if you can't get lip sync like the boys in Hollywood? Suppose you could get it? What would you do with it? Make a playlet and compete with the professionals on dialogue? Believe me, even the pros stuff is plenty corny at times. It's a lot safer to stick to your own field. Luckily, the boundaries of our field are not clearly defined, and never will be. Consequently, there is no curb on our self expression and we are limited only by our own skill and ingenuity. That is why it is so important to hang on to what we have learned and try to add to it.

Now, here comes the part that is apt to hurt. I'm all for the experienced helping the inexperienced but I think their help should stop short of ACTUALLY TAKING OVER AND DOING PART OF THE OTHER'S MOVIE MAKING FOR HIM. That is the personal privilege and, for my money, the sacred duty of every amateur, and particularly those who put their films into competition, to DO THEIR OWN WORK.

Surely, no self respecting amateur would let someone else do part of his movie making for him. That would rob him of the most pleasurable part of his hobby; the genuine pleasure and satisfaction that comes from having done something himself. Then, if his film wins an award, he can be justly proud of his achievement. Conversely, he can win all kinds of contests and pile up mountains of awards, but if they are won because of someone else's skill instead of his own, his victory will be as empty as the average movie maker's pocketbook. A trophy, in itself, is merely an object. It's what it stands for that really counts. I mean what it REALLY stands for and not just what it says on it.

It was Shakespeare who said, "First to thine own self, be true. Then it must follow, as the night the day, Thou canst not then be false to any man." All right, let's be honest, then. Do you think it is fair for ANYONE to get up and take the bows (via awards and other honors) for movies that actually may be excellent mostly because someone else's skill made them so? Perhaps some sound expert has put the sound to it for him; or some expert editor has edited it; or someone who is adept at titling has titled it for him. You know what I mean. I think we all know of some trophies that are reposing on the wrong mantles. Even if he gets his help for free, it's just as unfair.

How can we prevent it then? Contest rules wont do it. I think it must be done by instilling in the amateur himself, a PRIDE in doing his own work and a desire to learn by doing. His first efforts may not be very phenomenal but if he keeps at it, seeking instruction and guidance when and if he needs it, there is no limit to how far he can advance. Falling back on someone else's skill may bring him an award when doing it himself would not, but it wont do much for his self respect, or his advancement in skill. It's like the old school game. The fellow who lets his class mate do his arithmetic for him might fool the teacher and the rest of the class, and even come home with some excellent marks. But, if he hasn't earned them, he has defeated the whole purpose in going to school—that of learning.

My whole purpose in writing this is to point out how much fun it is to do your own work, anyway, and learn something about movie making in the process. So join the do-it-yourself craze and embody it in your movie making. You don't NEED anybody to do it for you. There is no phase of movie making that is so difficult that you cannot find out, somewhere, how to do it. The PSA's own technical library is a rich source of material and I have never known a worthwhile amateur who wouldn't answer your questions, or take time out to explain something to someone less skilled than he. And that's all you should expect of him. You should neither ask him to, nor let him, take over any of the various phases of your movie making.

Don't even envy the boys who have more elaborate equipment than you. After all, they may not know how to use it. There's always a way to do something. Even if it's a poor man's way. So improvise if you have to and do the best you can with what you have, or can cobble up. And then, if you win, you can really be justly proud.

Yes, it can happen to you. Good movies, that is, and if you are already a member and booster of PSA, it couldn't happen to a nicer person. Give the do-it-yourself plan a try. You'll be glad you did.

If the foregoing has not worn out my welcome, and I should by any chance, be invited to write again, I will try to point out a few of the ways I have found to simplify the art of movie making. For movie making is an art and the amateur has his own particular niche in it. It would be a shame if we allowed it to become so complicated that the amateur would be afraid to indulge in it.

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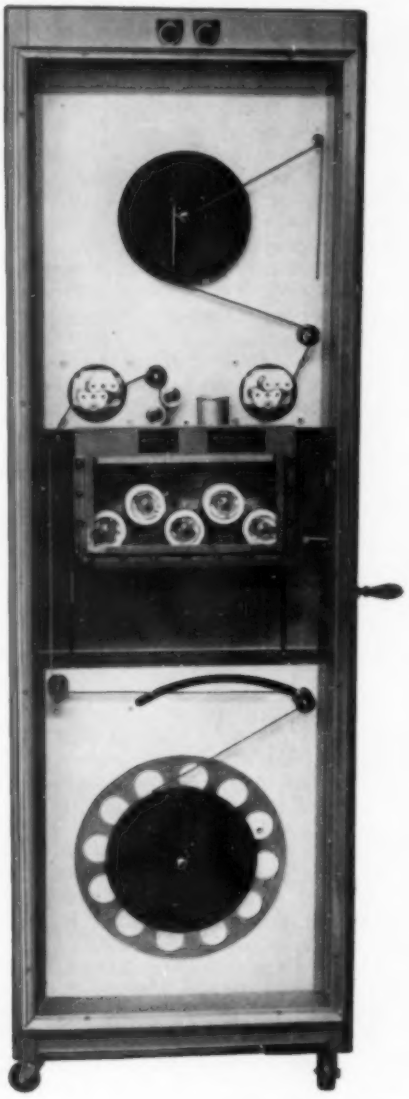

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Cinema Clinic

Conducted by George W. Cushman, APSA

Be Consistent

In my morning mail recently I received the following letter from a reader who begins:

> Dear Mr. Cushman: Why don't you be consistent? In your many articles on sound I have read, you continually tell the reader how to use sound, to add sound to his films, and you give the impression no film is good without sound. You even wrote a book on sound and you made a film I saw on the same subject.
>
> Yet in the Cinema Clinic last month you used the whole column to tell us how sound ruined the great film comedies of the silent era, and that if we wanted to make a great screen comedy we should forget sound. How come you keep changing your mind?

Mr. Reader, thanks for the fine compliment you have paid me. I am extremely happy that what little I say in print has interested you to the point of having read it intelligently. But I fear you have read a bit more into some of my words than I put into them.

At no time have I ever written, nor at any place have I ever said, that *all* scenes in *all* films should have sound.

I have been intrigued with sound and motion pictures ever since I constructed my first synchronized sound projector back in 1929. I have learned that sound, to be worth its salt, should never be merely added to a silent film. If sound is to be used with a film, it should be made an effective part of the film—not something thrown in or merely added to it.

But most important of all is the fact that the motion picture is primarily a visual medium, and that is what many movie makers, amateur and professional alike, are prone to forget. It is so much simpler to use words in a scene to tell something than to act the message out in pantomime.

I like apple pie. It is my favorite dessert. But I do not say it should constitute the entire meal, nor would I want it as dessert for every meal. What is more, it goes with some meals, yet not with others.

The use of sound is somewhat similar. Some films fall down so badly in a visual sense that they must resort to sound as a crutch. But a film that is 99% sound is a mighty bad movie, just as a meal of all pie would be a bad meal, even though the pie itself might be excellent.

Sound might be used most effectively to augment one or two scenes in a movie, especially when used by indirection, which I believe is the greatest use of sound in motion pictures, while throughout the rest of the film sound should be forgotten, just as pie can round off a good meal.

And third, there are films, such as the silent comedies of the early 1920's of which Keaton, Lloyd and Chaplin were masters, to which sound is not only not needed, but would be depreciatory if it were used, the same as apple pie just not going with some meals.

In my film library I have some of those early screen comedies. I have Harold Lloyd's "Safety Last" which he produced in 1923. From beginning to end it is a visual presentation. The titles are few and far between. I have put sound to many films which I have, but I have always felt that this picture was better left silent. I do not see how the addition of sound to this film could possibly improve it. It is the film in which Harold, a member of PSA by the way, climbs the outside of a skyscraper. I have shown this film many times to people of all ages, and it brings laughs like nothing currently seen today in the nation's movie theaters—proving that not only do we not see such examples of great screen comedy any more, but that sound is not needed when the motion picture tells its story visually.

I also have a print of "The Great Train Robbery," the first motion picture to tell a story, made in 1902. But whoever made this print decided that it wouldn't sell unless he added a sound track, so he added one.

I feel this sound is so unnecessary and so out of place with this film that I no longer play the track when I show the film. Historically, and visually, I feel the film packs more of a wallop to audiences who watch it when it is shown without the sound track.

What I was trying to say in the Clinic last month was that true screen comedy is created through the use of sight gags and sight situations alone. The moment sound is used as a part of the gag, it loses something—something which I cannot explain and which I have never seen or heard explained.

(*Continued on page* 53)

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Whether we humans find visual sights funnier than aural comedy, I do not know. But if we need proof, we have it when we note that the great sight comedies of the early 20's disappeared when sound came and have remained a thing of the past.

What I do say about sound is this: The public wants it. The public demands it. Yet the public does not know enough about the motion picture as an art to realize that primarily it is a visual medium. The true student of the motion picture, however, will accept it as a silent medium and enjoy it as such. But his kind are so few that the box office can't survive on his group alone.

Therefore sound—any sound, good or bad—is what the public, not knowing otherwise, demands. And that public filters down to your friends and my friends as they view our personally made films.

Since this condition exists—since even our personal friends and contest judges expect sound with our non-professional efforts, we feel we must give it to them.

So, finally, I say, if we must give it to them, let's give it to them correctly. Let's give it to them effectively. Let's really use sound and not merely add it. Let's make sound a part of the picture, not just a valueless appendage.

This visual medium doesn't have to have sound to be either successful or effective, but as long as the public wants sound, let's give it to them as best we can, and yet not cause our films to be 9/10 sound and to heck with the picture.

So, Mr. Reader, I do not feel that I have changed my mind. I have talked about using sound with films, and I have talked about films that don't need sound. There is more than just one kind of motion picture. If not, your accusation would be just and true. But since some films are better with sound and some are not, we would improve our concept of the motion picture medium if we were able to better distinguish between the two and use—or not use—sound, whichever was the better in any given instance.

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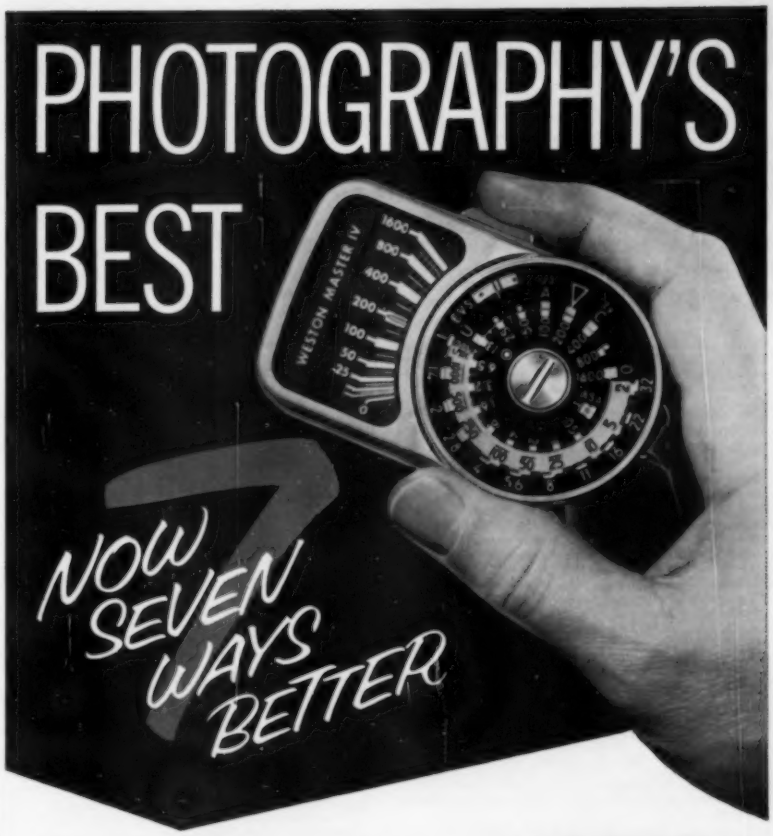

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These salons initially approved for Monochrome and/or Color Print portion only by Pictorial Division. See other listings on this page for approval of other sections.

(For listings and approval send data to Alfred W. Hecht, Hotel St. George, Clark and Henry Streets, Brooklyn 1, N. Y.)

Bulawayo (M,C) Closes May 28. Exhibited in June. Data: The Bulawayo Salon of Photography, PO Box 3291, Bulawayo, Southern Rhodesia, Africa.

Mocambique (M) Closes May 30. Exhibited July 11-26 at Lourenco Marques, then at Beira, Quelimane and Nampula. Data: Salon Secretary, PO Box 861, Lourenco Marques, Mocambique, Portuguese East Africa.

Calgary (M,C) Closes June 4. Exhibited July 11-16 at Calgary Exhibition and Stampede. Data: W. H. H. White, Salon Secty., Calgary Exhibition and Stampede Salon of Photography, Administration Bldg., Victoria Park, Calgary, Alberta, Canada.

Midland (M,C) Closes June 4. Exhibited July 16-August 13 at Art Gallery, Hanley, Stoke upon Trent. Data: George V. Billson, ARPS, FRSA, Grey Gables, Thurnview Road, Leicester, England.

Irish (M) Closes June 13. Exhibited July 25-August 6 at Molesworth Hall. Data: Hon. Secty., Irish Salon of Photography, 11 Hume St., Dublin, Ireland.

Luxembourg (M,C) Closes July 1. Exhibited July 29-August 21 at Musee de l'Etat a Luxembourg. Data: Ferdinand Thill, Chairman, 3 rue des Genets, Luxembourg City, Grand Duchy of Luxembourg.

Uruguay (M) Fee $1.25, checks only. Closes July 1. Exhibited August 1-15. Data: Eduardo Defey, Arch. Ave., Brasil 2359, Montevideo, Uruguay.

Edinburgh (M,C) Closes July 11. Exhibited August 30-September 10 in St. Cuthbert's Hall. Data: J. E. Black, 18 Dryden St., Edinburgh 7, Scotland.

Sydney (M) Closes July 13. Exhibited August 13-24 at Sydney Town Hall. Data: W. B. Allen, Secty., YMCA Camera Circle, 325 Pitt St., Sydney Australia.

Sacramento (North American) (M,C) Closes July 22. Exhibited August 31-Sept. 11 at California State Fair. Data: North American Intl. Photographic Exhibition, California State Fair, PO Box 2036, Sacramento, California.

Mexico (M,C) Fee $2.00. Closes July 23. Exhibited August 24-September 7. Data: Club Fotografico de Mexico, San Juan de Letran 80, ler piso, Mexico City 1, D. F., Mexico.

San Adrian de Besos (M,C) Closes July 25. Exhibited Sept. 3-14. Data: Sr. Secretario del 3er Salon Internacional, Agrupacion Fotografica San Juan Bautista, Apartado de Correos 18, San Adrian de Besos (Barcelona), Spain.

Yolo County (M,C) Fee $2.00. Closes July 26. Exhibited August 18-21 at Yolo County Fair, Woodland, Calif.; August 22 at University of California, Davis, California; Aug. 28-Sept. 4 at Crocker Art Gallery, Sacramento, Calif. Data: Davis Camera Club, PO Box 492, Davis, California.

Notices

To be listed on this page, notices of exhibitions must be sent to the individuals noted under each heading. Notices of PSA Competitions and of Contests should be sent direct to the Journal, 28 Leonard, Stamford, Conn.

Illinois State Fair (M,C) Closes July 27. Exhibited Aug. 12-21 at Illinois State Fair. Data: Mrs. Dorothy M. York, 308 West Lawrence Ave., Springfield, Ill.

Saluzzo (M,C) Closes July 31. Exhibited August 21-Sept. 18. Data: Il Soffietto Foto Club, Palazzo Italia, Saluzzo, Italy.

New Zealand (M) Closes August 1. Exhibited August 13-27. Data: Exhibition Secty., PO Box 2035, Dunedin South, New Zealand.

Wisconsin State Fair (M,C) Closes August 10. Exhibited Aug. 18-28 at Wisconsin State Fair, West Allis, Wisc. Data: Photo Show, Wisconsin State Fair, State Fair Park, West Allis 14, Wisconsin.

Hong Kong (1st C. P. A.) (M,C) Closes August 14. Exhibited October 3-8 at St. John's Cahedral Hall. Data: Mr. Ho, Chung-Hei, FRPS, Chairman, Chinese Photographic Assn. of Hong Kong, PO Box 4334, North Point, Hong Kong.

Oregon State Fair (M,C) Fee $2.00. Closes Aug. 20. Exhibited Sept. 2-10 at State Fair. Data: A. L. Thompson, Salon Director, Oregon State Fair, Salem, Oregon.

Los Angeles County Fair (M,C) Fee $1.00 plus postage. Closes August 27. Exhibited Sept. 16-October 2 at Los Angeles County Fair. Data: Photography Dept., Los Angeles County Fair Assn., Pomona, California.

Puyallup (M,C) Closes Sept. 3. Exhibited Sept. 17-25 at Western Washington Fair. Data: Western Washington Fair Assn., Puyallup, Washington.

PSA (M,C) Fee $2.00. Closes September 7. Exhibited Oct. 11-15 at PSA National Convention, Houston, Texas. Data: S. D. Chambers, APSA, ARPS, Chairman, 5212 7th St., Port Arthur, Texas.

Newcastle (M,C) Closes Sept. 14. Exhibited Oct. 15-Nov. 5 at Laing Municipal Art Gallery. Data: W. Warburton Pope, ARPS, Salon Secty., 9 Kimberley Gardens, Newcastle-upon-Tyne 2, England.

Metropolitan-New York (M,C) Fee $1.00 plus postage. Closes Sept. 17. Exhibited October 10-29 at IBM Gallery of Arts and Sciences, 16 East 57 St., New York. Data: Nan Justice, Salon Secty., PO Box 226, Wall Street Station, New York 5, New York.

Shreveport (M,C) Fee $2.00. Closes Sept. 28. Exhibited Oct. 21-30 at Louisiana State Fair. Data: Henry L. Rush, 740 Merrick St., Shreveport, La.

Queensland (M,C) Closes Oct. 7. Exhibited Nov. 7-12. Data: G. S. Burstow, Chairman, Photographic Society of Queensland, c/o Toowoomba Photographic Society, PO Box 339, Toowoomba, Queensland, Australia.

Leeds (M,C) Closes October 12. Exhibited Nov. 19-Dec. 4 at City Art Gallery. Data: A. Gardner, 44 Moseley Wood Green, Leeds 16, England.

Other Salons

Parana (M,C) Closes June 30. Exhibited in September. Data: Foto Club Colmeia, Rua Jose Loureiro 349, Curitiba, Parana, Brazil.

Salta (M,C) Closes July 10. Exhibited in September. Data: Foto Club Salta, M. A. Castro No. 213, Salta, Argentina.

Hong Kong Students (M,C) Fee 50¢. Limited to school and university students. Closes Sept. 1. Exhibited in October at University of Hong Kong. Data: Ng, Shiu-Keen, ARPS, Chairman, Student Salon of Photography, The Photographic Society, University of Hong Kong, Hong Kong.

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Color Slides

Approved for color slide section only.

(For listing and approval send data to Adolph Kohnert, APSA, West Main St., Amenia, N. Y.) Entry fee $1, unless otherwise specified.

Victoria: June 5-18, deadline May 12. Forms: Richard M. Stokes, 2789 Musgrave St., Victoria, B.C. Canada. 2¼ x 2¼ slides accepted.

Auckland: May 26-June 6, deadline May 13. Forms: Rodney A. Hoggard, P. O. Box 5128, Auckland, New Zealand.

Wichita: June 6-19, deadline May 14. Forms: Raymond Engstrand, 1921 N. Edwards, Wichita 3, Kans.

Denver: June 25, deadline May 16. Forms: D. W. McCullough, 1100 Colorodo Blvd., Denver 6, Colo.

Oregon Trail: June 5-15, deadline May 23. Forms: T. W. Osterholm, 7205 N. E. Mallory Ave., Portland 11, Ore.

Barcelona: June 17-25, deadline May 23. Forms: Sr. Ricardo Duran, Corcega, 281, Barcelona, Spain.

Southwest: June 24-July 4, deadline June 1. Forms: R. J. Smith, P. O. Box 337, La Mesa, Calif. 2¼ x 2¼ slides accepted.

Uruguay: Aug. 1-11, deadline July 1. Forms: Eduardo Defey, Arch. Ave., Brasil 2359, Montevideo, Uruguay, S. A. Entry fee $1.25, by check or International money order only.

Lewis and Clark: Aug. 17-20, deadline July 9. Forms: Mrs. Verle McFarlane, Postmaster's Box, Oregon City, Ore.

Sydney: Aug. 13-24, deadline July 13. Forms: W. B. Allen, 325 Pitt St., Sydney, Australia.

Detroit: Closes Aug. 16. Exhibited Aug. 25-Sept. 29. Data: Amos DeHosse, 16751 Bramell Ave., Detroit 19, Mich. Entry fee $1.25.

Rosario: Aug. 20-Sept. 4, deadline July 25. Forms: Sr. Louis Mervar, Casilla Correo number 621, Rosario, Argentina.

Memphis: Closes Aug. 24. Exhibited Sept. 4-25. Data: Fred Bauer, Jr., P.O. Box 7307, Memphis, Tenn.

Mexico: Aug. 24-Sept. 7, deadline July 30. Forms: Club Fotografico de Mexico, Ave., San Juan de Letran 80, Ier, Piso, Mexico 1, D.F. 2¼ x 2¼ slides accepted.

North American: Aug. 31-Sept. 11, deadline Aug. 4. Forms: Grant Duggins, P. O. Box 2036, Sacramento, Calif.

Yolo: Aug. 18-Sept. 1, deadline Aug. 10. Forms: Rita V. S. Ehret, P. O. Box 492, Davis, Calif.

Beaver State: Closes Aug. 1. Exhibited Sept., 2-10. Data: M. Craig Carver, Ore.. State Fair, P.O. Box 1507. Salem, Ore.

Los Angeles County Fair: Sept. 9-12, deadline Aug. 27. Forms: Mrs. Leona Piety, c/o Los Angeles County Fair Assn., Pomona, Calif.

Fresno: Closes Sept. 20. Data: H. S. Barsam, 4125 Ventura Ave., Fresno 2, Calif.

CPA—Hong Kong: Oct. 3-8, deadline Aug. 28. Forms: Mr. Ho Chung-Hei, FRPS, P. O. Box 4334, North Point, Hong Kong, 2¼ x 2¼ slides accepted.

PSA—Houston: Oct. 11-15, deadline Sept. 7. Forms: S. D. Chambers, APSA, ARPS, 5212 7th St., Port Arthur, Texas. 2¼ x 2¼ up to 4 x 5 slides accepted. Entry fee $1.25.

Westchester: Oct. 15-29, deadline Sept. 21. Forms: Mrs. Margaret Hessberg, 24 Park Rd., Scarsdale, N. Y.

Louisiana State Fair: Oct. 22-30, deadline Sept. 28. Forms: Henry L. Rush, 740 Merrick, Shreveport, La. Entry fee $1.25.

Newcastle Upon Tyne: Oct. 15-Nov. 5, deadline Sept. 28. Forms: W. Warburton Pope, ARPS, 9 Kimberly Gardens, Newcastle Upon Tyne 2, England.

Calgary: Closes Nov. 2. Exhibited Nov. 8-10. Data: Charles J. Everest, 142 Rosery Dr., Calgary, Alta., Canada.

Magic Empire: Oct. 25-Nov. 3, deadline Oct. 1. Forms: Joe E. Kennedy, FPSA, 1029 Kennedy Bldg., Tulsa 3, Okla.

Chicago: Oct. 27-Nov. 6, deadline Oct. 3. Forms: Cora A. Gruner, 5952 Hermitage Ave., Chicago 26, Ill.

Queensland: Nov. 7-12, deadline Oct. 5. Forms: Toowoomba Photographic Society, P. O. Box 339, Toowoomba, Queensland, Australia.

Metropolitan New York: Nov. 15-Dec. 1, deadline Nov. 1. Forms: Nan Justice, Box 226, Wall St. Sta., New York 5, N. Y.

Mississippi Valley: Nov. 5-8, deadline Nov. 1. Forms: E. V. B. Prince, APSA, 8840 Eager Road, Brentwood 17, Mo. Entry fee $1.25.

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Nature

(For listing and approval send data to T. R. Farrington, FPSA, 10300 S. Fairfield Ave., Chicago 43, Ill.)

Oregon Trail, June 5-10, closing, May 16th. Slides. Forms: T. W. Osterholm, 7205 N.E. Mallory Ave., Portland 11, Oregon.

Southwest, June 24-July 4, closing June 8. Slides. Forms: R. J. Smith, P. O. Box 337, La Mesa, Calif.

Sydney, Aug. 13-24, closing July 13. Slides. Forms: W. B. Allen, 325 Pitt St., Sydney, Australia.

Santa Barbara, July 16-23, closing June 30. Prints & slides. Forms: Paul Grim, 2322 Oak Park Lne, Santa Barbara, Calif.

Exhibitions & Competitions

Merced, Aug. 9-28, closing July 29. Prints & slides. Forms: G. W. Robinson, APSA, P. O. Box 10, Merced, Calif.

PSA, Oct. 11-15, closing Sept. 7. Prints & slides. Forms: S. D. Chambers, APSA, ARPS, 5212 7th Street, Port Arthur, Texas.

Los Angeles County Fair, Sept. 16-Oct. 2, closing Aug. 27. Prints & slides. Forms: Los Angeles County Fair, Pomona, Calif.

Westchester, Oct. 15-29, closing Sept. 21. Slides. Forms: W. J. Clark, 53 Chestnut Ave., Pelham, N. Y.

Newcastle, Oct. 15-Nov. 5, closing Sept. 23. Slides only. Forms: W. Warburton Pope, ARPS, 9 Kimberly Gardens, Newcastle upon Tyne 2, England.

Louisiana State Fair, Oct. 21-30. Slides. Forms: Henry L. Rush, 740 Merrick St., Shreveport, Louisiana.

Queensland, Nov. 7-12, closing Oct. 5. Prints & slides. Forms: G. S. Burstow, P. O. Box 339, Toowoomba, Queensland Australia.

Judging at Houston Convention. Data from Lloyd Gregory, 331 Hillside Village, Dallas, Tex.

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Stereo

(For listing send data to Lewis F. Miller, APSA, 8216 Morgan St., Chicago 20, Ill.)

Uruguay, Closes July 1. 4 slides $1.25 (See March Stereogram). Forms: Eduardo Defey, Arch. Ave. Brasil 2359, Montevideo, Uruguay, S. A.

Hollywood, Closes July 13. 4 slides $1.25. Forms: Duane M. Smith, 7866 Seville Ave., Huntington Park, California.

Sydney, Closes July 13. 4 slides $1.00. Forms: A. R. Andrews, YMCA Camera Circle, 325 Pitt Street, Sydney, Australia.

Mexico, Closes July 30. 4 slides $1.00. Forms: Club Fotografico de Mexico, San Juan de Letran No. 80, Mexico, D. F.

PSA: Closes Sept. 7. 4 slides $1.00 plus postage. Forms: S. D. Chambers, APSA, ARPS, 5212 7th Street, Port Arthur, Texas.

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PSA Competitions

TD Traveling Exhibits—Examples of uses of photography in all branches of the sciences. No closing date, shows are put on road as assembled, also used in Tops. Data: Art Hansen, Box 82, Parlin, N. J.

CD Portrait Contests—Full details and entry form in July-August Color Division Bulletin. Data: John Sherman, FPSA, 503 Mobil Oil Bldg., Minneapolis 2, Minn.

CD International Slide Competition—Four slides, not previously accepted in exhibitions, or winners in this competition. Meant to aid beginners. Information: Virginia Goldberg, APSA, 635 Jefferson Ave., Reading 15, Ohio.

Nature Print Contest—(Individuals) Three contests, 4 prints 5x7 to 16x20, medals and ribbons. Data: F. W. Schmidt, Dept. Med. Illus., University of Texas Medical Branch, Galveston, Tex.

International Club Print Competition — Four classes, clubs may join at any time. Write for data to Ralph M. Carpenter, 99 Orange St., Stamford, Conn.

Nature Slide Contest—(Individuals) Four contests, three classes, either 2x2 or 2¼x2¼ slides. Data: Dr. B. J. Kaston, APSA, 410 Blake Rd., New Britain, Conn.

PD Color Print Contest—For PD members only. Data: Mrs. Happy K. Hamilton, 9 Binney Lane, Old Greenwich, Conn.

Print of the Month Contest—For PD members only. Data: Alicia Parry, APSA, 609 Sedgwick Drive, Syracuse 3, N. Y.

CD Slide Sequence—Travel sets of 50 to 100 slides, also Photo essays of 25 to 100 slides with commentaries. Entries close June 1, 1960. Entry forms and data from T. C. Wetherby, 116 Avenue L. Pittsburgh 21, Penna.

Whom To Write

SALONS—Write the person listed for forms. Note that salons are on the list for months ahead and that additions are made every month. Allow yourself plenty of time to get the forms and ship your entry. SERVICES—Write the person listed. If in doubt, several Divisions list under "Membership" the person who can steer you to the correct source of information. Note separation of services for Individuals and services for Clubs. "Individuals" includes only PSA members. (All service leaders are requested to notify the Journal of address changes at the same time they notify Headquarters.) Names and addresses of Division and Zone heads are listed under the Board of Directors on page 3. Write them if your question covers other subjects.

PSA Services Directory

(Corrected to June 1, 1960)

PSA Services

PSA Publications

(All inquiries about circulation should be addressed to Headquarters, 2005 Walnut St., Phila. 3, Pa.)

Editor pro tem:

PSA Journal — Ruth Bennett, FPSA, 28 Leonard St., Stamford, Conn.

Color Division Bulletin—E. A. Tucker, 3625 Carter Ave., St. Louis 7, Mo.

Cine-Reporter—George Merz, APSA, FACL, 1443 Harrison St., Hollywood, Fla.

Nature Shots—Elizabeth Kaston, 410 Blake Road, New Britain, Conn.

P-J Bulletin—Joseph Fabian, 252-39 Brattle Road, Little Neck, N. Y.

Pictorial Division Bulletin—Conrad Falkiewicz, APSA, 23 Daisy Place, Tenafly, N. J.

Stereogram—Don Forrer, 31-60 33rd St., Long Island City 6, N. Y.

PS&T—Ira B. Current, FPSA, 26 Woodland Ave., Binghamton, N. Y.

Camera Club Bulletin—Alva L. Dorn, 3823 Dale St., Kalamazoo, Mich.

TD Newsletter—Arthur W. Hansen, P. O. Box 202, Parlin, N. J.

Services to Exhibitions

(Recognition, listing and approval of exhibitions is handled for PSA by the several Divisions. Who's Who listings are published annually. Notices of coming exhibitions should be sent to persons listed on the Exhibitions and Competitions page.)

Aids and Standards

Color—Adolph Kohnert, APSA, W. Main St., Amenia, N. Y.

Nature—T. R. Farrington, FPSA, 10300 S. Fairfield Ave., Chicago 43, Ill.

Pictorial and Color Prints—Alfred W. Hecht, Hotel St. George, Clark & Henry Sts., Brooklyn 1, N. Y.

Stereo—John Paul Jensen, 8000 S. Merrill Ave., Chicago 17, Ill.

Master Mailing List

Color—Miss Lillian Draycott, 34 Connecticut Ave., Freeport, N. Y.

Color Prints—Harry Baltaxe, APSA, 91 Payson Ave., New York 34, N. Y.

Nature—Mrs. E. H. Roper, 3523 Oakway Drive, Toledo 14, O.

Pictorial—North American Salons, Ken Willey, APSA, 701 Fifth St., Lyndhurst, N. J.

Overseas Salons, Mrs. Rhyna Goldsmith, 21-20 78th St., Jackson Heights, L. I., N. Y.

Stereo—Miss Dorothy Otis, 1280 Chili Ave., Rochester 11, N. Y.

Who's Who

Color—Mrs. Pearl Johnson, APSA, 661 Merton Rd., Detroit 3, Mich.

Color Prints—Harry Baltaxe, APSA, 91 Payson Ave., New York 34, N. Y.

Nature—Mrs. Augusta Dahlberg, 1121 W. 93 St., Chicago 20, Ill.

Pictorial—N. American, Ken Willey, APSA, 701 Fifth St., Lyndhurst, N. J. **Overseas,** Mrs. Rhyna Goldsmith, 21-20 78th St., Jackson Heights, L. I., N. Y.

Stereo—Mrs. Ruth Bauer, 3750 West St., Mariemont, Cincinnati 27, Ohio.

Services to Individuals

Chapters—John Sherman, FPSA, 503 Mobil Oil Bldg., Minneapolis 2, Minn.

Travel—Tom Firth, FPSA, Trappe, Md.

Travel Aides—Mrs. Caryl Firth, FPSA, Trappe, Md.

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Division Services

Color Division

CD Membership Slides—Mrs. Elva Hayward, 3631 Rose Ave., Long Beach 7, Calif.

Exhibition Slide Sets and Travel Slide Sets —East: Charles Jackson, 406 E. York Ave., Flint 5, Mich.; **Central:** Rohmer B. Beard, 4025 Mangum St., Shreveport, La.; **West:** Mrs. Marion Roberts, 152-12 Giordano, La Puenta, Calif.; **Canada:** Edward Tozer, 300 Elmwood Ave., Oshawa, Ont.

Hospital Project—Send slides to Chas. H. Green, APSA, 19261 Linda Vista Ave., Los Gatos, Calif.

Star Ratings—Mrs. Ina Lank, 1900 Mantis Ave., San Pedro, Calif.

Slide Circuits—R. B. Horner, APSA, 2921 Cassia, Boise, Idaho.

International Slide Circuits—Mrs. Arthur B. Hatcher, 125 Columbus Ave., Port Chester, N. Y.

Slide Study Groups — Mrs. Lenore Bliss Hayes, 718 N. Brainerd Ave., La Grange Park, Ill.

Instruction Slide Sets—East: Charles Jackson, 406 East York Ave., Flint 5, Mich. **West:** Lee F. Fuller, 1171 East Seneca Street, Tucson, Arizona. **Canada:** Edward G. Tozer, 310 Elmgrove, Oshawa, Ontario, Canada.

International Slide Competition—Robert H. Kleinschmidt, 41 Parkside Crescent, Rochester 17, N. Y.

Permanent Slide Collection — George F. Johnson, FPSA, Forestry Bldg., State College, Pa.

Library—Hoyt L. Roush, APSA, Johnston Bldg., Charlotte 2, N. C.

Travel Slide and Story Competition—Tracy Wetherby, 116 Avenue L, Pittsburgh, Penna.

Portrait Competition—Next closing Nov. 1. John Sherman, FPSA, 503 Mobil Oil Bldg., Minneapolis 2, Minn.

Photo Essay Workshop—Capt. Jack L. Kenner, USN, APSA, Comsublant Staff, Fleet P.O., New York, N. Y.

Slide Evaluation Service—Jack Lowe, 403 Montgomery St., Marietta, O.

Tape Recording Service—Merle S. Ewell, FPSA, 1422 West 48th St., Los Angeles 62, Calif.

(Continued on following page)

PSA Services Directory

(Continued from preceding page)

INDIVIDUALS

Division Services

Motion Picture Division

Annual Film Competition—Charles J. Ross, APSA, 3350 Wilshire Blvd., Los Angeles 5, Calif.

Film Library—John J. Lloyd, APSA, 355 Colorado Pl., Long Beach 14, Calif.

Book Library—Ed Greer, 4916 Silver, Kansas City 6, Kansas.

Film Analysis and Judging Service—Ernest F. Humphrey, APSA, 1152 Hetfield Ave., Westfield, N. J.

Tape Library—Markley L. Pepper, 3620 Newton St., Denver 11, Colo.

Technical Information — Wm. Messner, APSA, 999 Garrison Ave., Teaneck, N. J.

Nature Division

Instruction Slide Sets — East: Norman E. Weber, Bowmansville, Pa. **West:** Bernard G. Purves, APSA, 1781 Hollyhill Lane, Glendora, Calif.; **Canada:** Mary W. Ferguson, APSA, 76 Kilbarry Rd., Toronto 7, Ont.

Exhibition Slide Sets—East: Gilbert R. Lehmbeck, APSA, 19310 Eastwood Dr., Harper Woods 36, Mich. **West:** Francis A. Kingsbury, Ponca, Neb. **Canada:** Mary W. Ferguson, APSA, 76 Kilbarry Rd., Toronto 7, Ont.

Print Sets—George Brewster, 2236 N. Buchanan Ave., Arlington 7, Va.

Librarian—Albert E. Cooper, 5010 N. 36th St., Omaha 11, Neb.

Hospital Project—Send slides to Chas. H. Green APSA, 19261 Linda Vista Ave., Los Gatos, Calif.

Star Ratings—Dr. Gordon B. White, FPSA, 239 Sugarloaf St., Port Colbourne, Ontario, Canada.

Print Competition—F. W. Schmidt, Dept. of Medical Illustration, University of Texas Medical Branch, Galveston, Texas.

Identification Service—Dr. B. J. Kaston, APSA, 410 Blake Rd., New Britain, Conn.

Slide Competition—Dr. B. J. Kaston, APSA, 410 Blake Road, New Britain, Conn.

Slide Study Circuits—Miss Katherine M. Feagans, 102 S. Summit Ave., Bremerton, Wash.

Print Study Circuits—Le Roi Russel, 343 Shasta, Prescott, Arizona.

Technical Information Service—Edward H. Bourne, APSA, 40 Woodside Drive, Penfield, N. Y.

Commenting Service for Newer Workers—Slides, George W. Robinson, APSA, P. O. Box 10, Merced, Calif. **Prints,** Cy Coleman, 6159 Dorothy St., Detroit 11, Mich.

Canadian Representative—Mary W. Ferguson, APSA, 76 Kilbarry Rd., Toronto 7, Ont

Photo Journalism Division

Journalism Circuits—Don Mohler, APSA, 25291 Richards Ave., Euclid 23, Ohio.

Critiques—Lewis E. Massie, P. O. Box 745, Del Mar, Calif.

PJ Membership Information—Daniel Zirinsky, 9303 Shore Road, Brooklyn, N. Y.

PJ Education—Joseph Bernstein, APSA, 353 West 56th St., New York, N. Y.

PJ Library—Mrs. Toni Stibler, 410 52nd Street, Brooklyn 20, N. Y.

PJ Honors & Awards—Alfred C. Schwartz, FPSA, 38 Avis Drive, New Rochelle, N. Y.

Pictorial Division

PD Information Desk—Miss Shirley Stone, 8 E. Pearson St., Chicago 11, Illinois.

American Portfolios—Mrs. Barbara M. Sieger, APSA, 200 Braunsdorf Rd., Pearl River, N. Y.

Fotos International—Ed Willis Barnett, APSA, 2323 Henrietta Rd., Birmingham 5, Ala.

Canadian Portfolios—Gino Maddalena, 1262 Place Royale, St. Martin, Laval Co., Que.

Color Print Activities—Mrs. Catherine C. DeLamoy, 223 Prospect St., E. Orange, N. J.

Star Ratings (Color Prints)—Harry Baltaxe, APSA, 91 Payson Ave., New York 34, N. Y.

Color Print Sets—Paul Clark Clough, 24 East Eager Street, Baltimore 2, Maryland.

Hand Colored Print Portfolios—Mrs. Barbara M. Seiger, APSA, 200 Braunsdorf Road, Pearl River, N. Y.

Color Print Portfolios—Mrs. Barbara M. Seiger, APSA, 200 Braunsdorf Road, Pearl River, N. Y.

Star Exhibitor Portfolios—Dr. Robert M. Cochran, APSA, 452 Aquila Ct., Omaha 2, Neb.

Portrait Portfolios—Miss Dorothy Kluth, 2415 W. Birchwood Ave., Chicago 45, Illinois.

Portfolian Clubs—Sten T. Anderson, FPSA, 3247 Q. St., Lincoln 3, Nebraska.

Picture of the Month—Miss Alicia Parry, APSA, 609 Sedgwick Dr., Syracuse 3, N. Y.

Award of Merit (Star Ratings)—Mrs. Leta M. Hand, APSA, 1927 Devonshire Ave., Lansing 10, Mich.

Personalized Print Analysis—Paul Yarrows, Kodak Exhibit, East Balcony, Grand Central Terminal, New York 17, N. Y.

Salon Workshop—John T. Caldwell, Jr., APSA, P. O. Box 4682, Fondren Sta., Jackson, Miss.

Salon Labels—(Enclose 4¢ stamp) Mrs. Margery Barrett, 239 Columbia St., Adams, Mass.

PD Membership Information—East: Clarence Abrams, 2863 Rose Ann Lane, Cincinnati 39, Ohio. **West:** Mrs. Evelyn Serena, 2952 Serena Place, Santa Barbara, Calif.

PD Lending Library—Miss Suzanne Chevrier, 370 E. 69th St., New York 21, N. Y.

Firth Landscape Contest—Lloyd Gregory, 331 Hillside Village, Dallas, Texas.

PD Service Awards—J. M. Endres, FPSA, 1235 Circle Dr., Tallahassee, Fla.

Stereo Division

Newcomer's Committee—Clair A. England, APSA, 1884 San Antonio Ave., Berkeley 7, Calif.

Personalized Slide Analysis—Fred Wiggins Jr., APSA, 438 Meacham Ave., Park Ridge, Ill.

Individual Slide Competition—Hilbert J. Wagner, Rte. 1, Daniels Drive, Germantown, Wis.

Slide Circuits—Mrs. Pearl Johnson, APSA, 661 Merton Rd., Apt. 3, Detroit 3, Mich.

Slides for Veterans—Miss Marjorie Price, 503 W. 121st St., New York 27, N. Y.

Slides for Handicapped Children — Harry McGillicuddy, 116 Truesdale St., Rochester 13, N. Y.

Star Ratings — Miss Helen Brethauer, 4057 Masterson St., Oakland 19, Calif.

SD Membership Information — Miss Leona Hargrove, 619 N. Ridgewood, Wichita 6, Kans.

SD Membership Slide—John C. Stick, APSA, 1701 S. Bushnell Ave., So. Pasadena, Calif.

Emde Slide Sequence—Frederick Adams, 700 Bard Ave., Staten Island, N. Y.

Subject Slide Sets—Henry H. Erskine, APSA, 1282 Sherwood Rd., Highland Park, Ill.

International Circuits—Lee M. Klinefelter, 1800 La Salle Ave., Norfolk, Va.

Techiniques Division

Photographic Information—John R. Kane, R. D. No. 1, Chenango Forks, N. Y.

Traveling Exhibits—John F. Englert, APSA, 853 Washington Ave., Rochester, N. Y.

CLUBS

PSA Services

Camera Clubs—Russel A. Kriete, APSA, 3946 N. Lowell Ave., Chicago 41, Ill.

Camera Club Council Activities—Robert M. Cochran, APSA, 5410 Izard St., Omaha 32, Neb.

Club Bulletin Advisory Service—Henry W. Barker, FPSA, 392 Hope St., Glenbrook, Conn.

National Lectures—Drake Delanoy, APSA, 50 Valley Road, Montclair, N. J.

Recorded Lectures—Nelson Murphy, 445 Allison Ave., Washington, Pa.

Tops—R. B. Horner, APSA, 2921 Cassia, Boise, Idaho.

International Exchange Exhibits—East: Edmund Mayer, 20 Metropolitan Oval, New York 62, N. Y. **Central:** Wilson Shorey, APSA, 809 Putnam Bldg., Davenport, Iowa. **West:** Oliver Rockwog, 5244 Lathrop St., Los Angeles 32, Calif.

Division Services

Color Division

Veterans Hospital Slide-Getter Sets—Miss Jean Edgcumbe, 40 Frankland Road, Rochester 17, N. Y.

Exhibition Slide Sets—East: Mrs. Gertrude Wohltman, 120 Gale Place, New York 63, New York. **Mid-West:** Don J. Henley, 5209 Procter St., Port Arthur, Texas. **West:** Mrs. Claire Webster, 2 Hillcrest Court, Berkeley 5, Calif. (Incl. Alaska & Hawaii.) **Canada:** C. K. Cucksey, 11 Buckingham Ave., Chatham, Ontario.

Slide Set Directory—Miss Grace Custer, 3420 N. Meridian, Indianapolis, Ind.

Color Slide Circuits—J. Sheldon Lowery, Rte. 1, Box 135, Davis, Calif.

National Club Slide Competition—Dr. J. H. Arrieta, 155—14th Ave., San Francisco, Calif.

Pictorial Chicago Project—Miss June Nelson, APSA, 5555 Sheridan Road, Chicago 40, Illinois.

Judging Service—Mrs. Pauline Bodle, 59 Spring Brook Road, Morristown, N. J.

Photo Essay Workshop—Jack L. Kenner, APSA, 5503 Holmes Run Pkwy., Alexandria, Va.

Tape Recording Service—Merle S. Ewell, FPSA, 1422 West 48th St., Los Angeles 62, Calif.

Motion Picture Division

Film Library—John J. Lloyd, APSA, 355 Colorado Pl., Long Beach 14, Calif.

Tape Library—Markley L. Pepper, 3620 Newton St., Denver 11, Colo.

Nature Division

Instruction Slide Sets — East: Norman E. Weber, Bowmansville, Pa. **West:** Bernard G. Purves, APSA, 1781 Hollyhill Lane, Glendora, Calif.: **Canada:** Mary W. Ferguson, APSA, 76 Kilbarry Rd., Toronto 7, Ont.

Exhibition Slide Sets—East: Gilbert R. Lehmbeck, APSA, 19310 Eastwood Dr., Harper Woods 36, Mich. **West:** Francis A. Kingsbury, Ponca, Neb. **Canada:** Mary W. Ferguson, APSA, 76 Kilbarry Rd., Toronto 7, Ont.

Print Sets—George Brewster, 2236 N. Buchanan St., Arlington 7, Va.

Librarian — Albert E. Cooper, 5010 N. 36th St., Omaha 11, Neb.

Hospital Project—Send slides to Chas. H. Green, APSA, 19261 Linda Vista Ave., Los Gatos, Calif.

Veterans Hospital Slide-Getter Sets—Mrs. Jean Edgecumbe Groff, APSA, 40 Frankland Road, Rochester 17, N. Y.

National Club Slide Competition—Mrs. Irma Louise Rudd, APSA, 1602 S. Catalina, Redondo Beach, Calif.

Pictorial Division

American Exhibits—East: Les Buckland, 343 State St., Rochester 4, N. Y. **Central:** Dr. C. F. Wadsworth, 608 Brown Bldg., Wichita, Kans. **West:** John Wippert, 12237 E. Kerrwood St., El Monte, Calif. **Northwest:** Al Deane, 5022—50th Ave., S.W., Seattle 16, Wash.

Club Print Circuits—Edmund V. Mayer, 20 Metropolitan Oval, New York 62, N. Y.

Club Print Exchange Directory—E. G. Rutherford, 1505 College Ave., Racine, Wis.

Club Print Judging Service—West: Don. E. Haasch, 3085 Teton St., Boise, Idaho. **East:** Robert B. Porter, 2107 Sixth St., Palmetto, Fla.

International Club Print Competition—Ralph M. Carpenter, 99 Orange St., Stamford, Conn.

Portfolio of Portfolios — Mrs. Gretchen M. Wippert, APSA, 12237 E. Kerrwood St., El Monte, Calif.

Salon Practices—Alfred W. Hecht, Hotel St. George, Clark & Henry Sts., Brooklyn 1, N. Y.

Salon Instruction Sets—Harold B. Spriggs, Livingston Manor, N. Y.

Color Print Activities — Miss Catherine Coursen, 223 Prospect St., E. Orange, N. J.

Color Print Sets—Paul C. Clough, 24 E. Eager St., Baltimore 2, Md.

Stereo Division

Club Slide Circuits—Roland S. Stroup, 142 N. E. Home, Bartlesville, Okla.

National Club Stereo Competition—E. K. Metzdorf, 2222 Pennsylvania, Topeka, Kan.

Local Programs—Harold Johnson, APSA, 661 Merton Rd., Apt. 3, Detroit 3, Mich.

Traveling Salon — Paul S. Darnell, 411 S. Ridgewood Rd., S. Orange, N. J.

International Services & Activities—Walter J. Goldsmith, APSA, 24 Fifth Ave., New York 11, N. Y.

Subject Slide Sets—Henry H. Erskine, APSA, 1282 Sherwood Rd., Highland Park, Ill.

Club Services—Marjorie Griffin, 4020 Norbourne Rd., Louisville 7, Ky.

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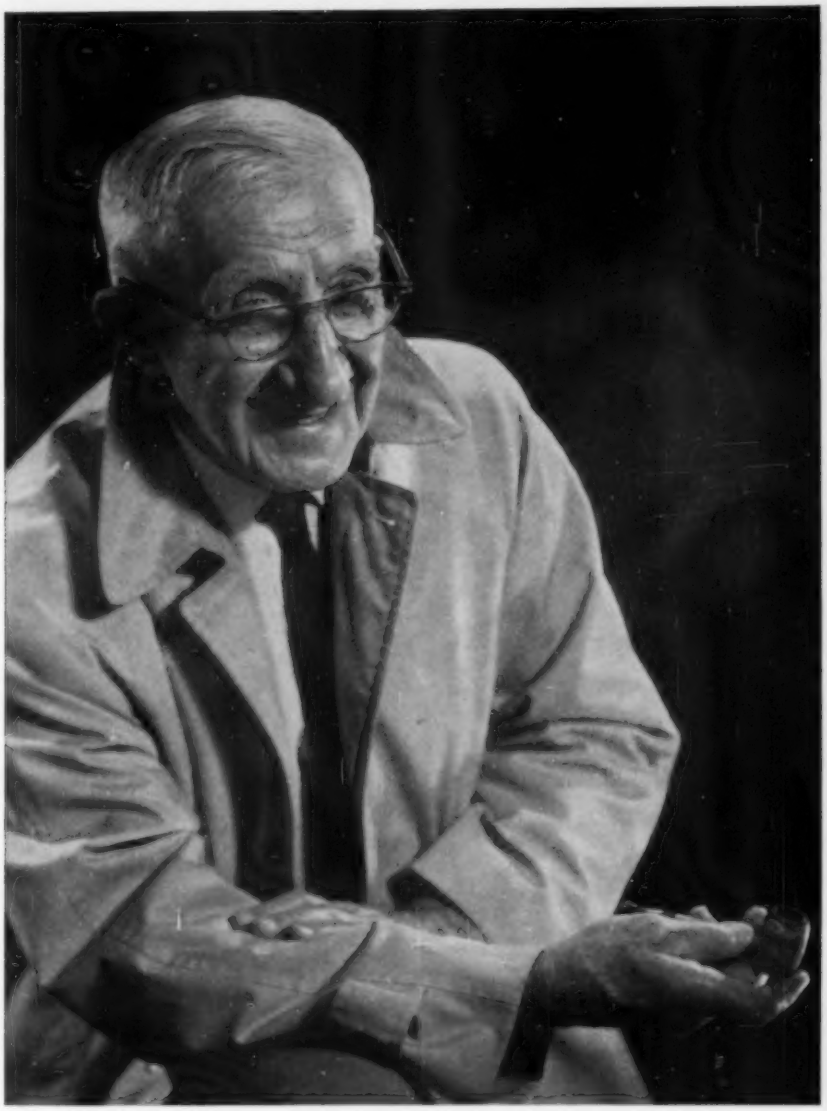

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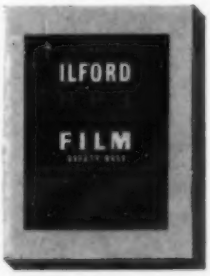

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